FEBRUARY, 1931

The FLEET OWNER

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Publ'n Fleet Owner
Date of Issue Feb. 1931 Page No. 13
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In This Issue:

Servicing a Small Fleet
Fleet Maintenance Problems
Fuel Economy in the Shop
Hints on Caring for Tires
Borg & Beck Clutch Service
Welding Cracked Blocks
Improvements for 1931
Other Features

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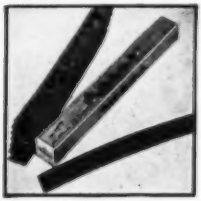

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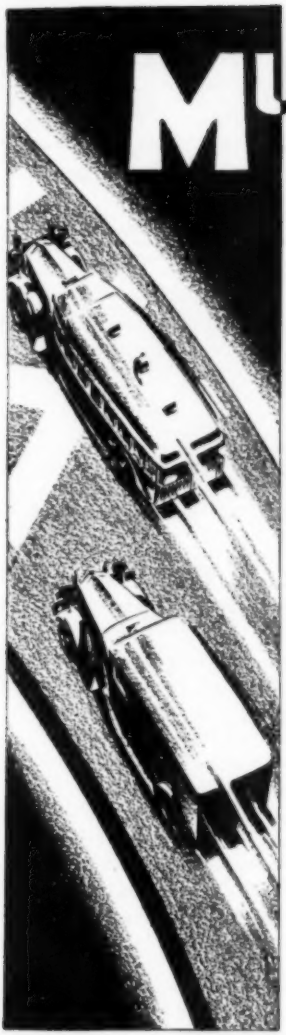

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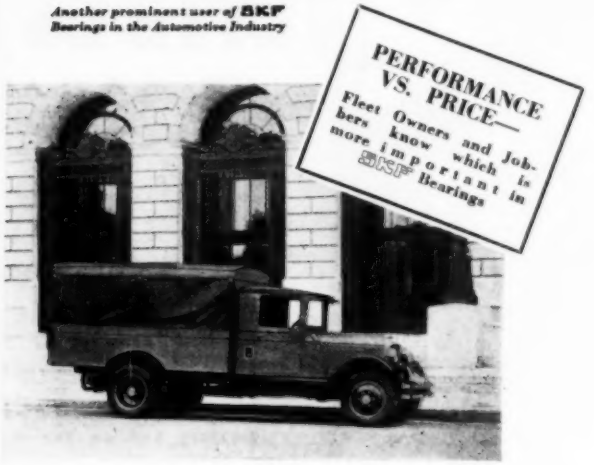

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"Service Their Own"

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HENRY CLAY FISCHER
Editor

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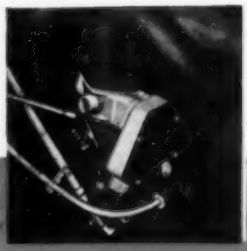

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FROM laundry fleets, large or small, the report on Handy Governor is always the same.

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Have the nearby Handy distributor install Governors on your whole fleet. Set them to the top speed above which you do not wish your drivers to travel. Seal the adjustment. Then watch delivery costs come down and profits go up!

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The FLEET OWNER

"For Those Who Service Their Own"

***PUBLISHED** monthly in the interests of Automotive Fleet Owners who maintain their own Repair and Service Shops, and devoted to the better operation and maintenance of Trucks, Passenger Cars, Busses and Taxis.*

HENRY CLAY FISCHER, Editor

Vol. 6 **New York, February, 1931** **No. 2**

The Rails Versus the Motors

SO much has been said, written and published, both pro and con, regarding the present controversy between the railroad companies and the automotive common carriers of passengers and freight, that to add to the avalanche of newsprint that has been claiming even front page positions seems unca led for and futile.

However, and naturally, there is every reason for us to register our righteous indignation against many of the statements made to the effect that trucks and busses enjoy the "free use of the highways at public expense" or words to that effect. Would that this were the actual case, but unfortunately for us it is not.

It is not necessary to point out the manners by which automotive operators "pay and pay and pay" for the use of the public highways—a glance at the schedule of gasoline taxes (to our minds the most accurate method of taxation) imposed by the respective states reveals one form of payment. Another form consists of the annual license fees which every operator must pay before his vehicles can "hit the roads," some of which are even now called unreasonably high.

"When better service is rendered, the busses and trucks will render it" seems to be a fitting slogan for our industry and this fact, for it seems now to be a fact, is apparently the underlying

cause of all the controversy. If *modern* service is rendered by the automotive industry, to the direct detriment of other forms of transportation, it would seem that those other forms of transportation have a job on their hands. And that job is one of offering more for the same money, if possible, instead of what some writers have called "squawking." After all, competition is the life-blood of industry, and that is what our present problem involves.

On the other hand, we cannot afford to sit tight and rest on our laurels, for they surely are laurels. Just as the railroads have it in their power to combat the "menace" of fair competition, so have we in the automotive industry equal opportunity to combat the real, bonafide "menace" of higher, unreasonable taxes imposed upon the bus and truck. The Interstate Commerce Commission is making every effort to analyze the situation unbiasedly. Operators should join their local motor truck and bus organizations in attempting to secure nothing but appropriate, fair legislation.

Danger Seen in Wood Alcohol

WARNINGS have been issued by various health authorities against contact with wood alcohol, particularly in view of the fact that some of the poisonous variety of alcohol is likely to find its way into the automotive field during the present winter season, for use as an anti-freeze agent.

A bulletin recently issued points out the difference between denatured alcohol and wood alcohol, in which the former is declared to be safe when judiciously used as an anti-freeze, but the latter (methanol) to be quite dangerous.

It is further pointed out that an exceedingly small amount of wood alcohol will produce poisonous symptons and that it is poisonous when swallowed, inhaled or absorbed through the skin. Competent scientific investigators, the bulletin says, have declared that this substance is equally dangerous whether taken into the system through the mouth, the skin or the lungs.

On the other hand, observations made by the U. S. Bureau of Mines, according to a circular just issued, indicate that there is no danger of poisoning from the reasonable use of methanol as an anti-freeze for automobile radiators. The Bureau points out that only by *continued* exposure to *high concentrations* of methanol that serious poisoning is likely to be caused. So use your own judgment in your anti-freeze selection.

1930 *Tests Stability of* Truck Industry

Modern Appliances Increase Truck Utility — 1931 Outlook Looms Bright in Domestic, Foreign Fields

By A. J. Brousseau*

ABILITY "to deliver the goods" under the most adverse conditions was demonstrated effectively by commercial motor vehicles in 1930. During a twelve-month period of "hand-to-mouth" buying, industries found it necessary to ship merchandise in small lots to buyers on demand. They turned to the motor truck which hauled millions of tons with a service and economy that no other carrier could duplicate.

American manufacturers produced 561,800 motor trucks in 1930, 33 per cent less than the record production of 1929, but a comparatively small decrease when world economic conditions are considered.

Manufacturers produced 576,540 trucks in 1928—the record year up to that time.

There are several causes for the temporary falling off in motor truck production. During the depression, less traffic was moved due to the suspension of trade and industrial activity.

This can not be interpreted as showing a diminution in the need for truck service.

On the contrary, the truck during the past year established itself more firmly as an indispensable factor in practicaly every line of business.

For example, many manufacturers who formerly made a practice of storing merchandise in warehouses, awaiting demands from wholesalers and retailers, found the procedure inadequate due to heavy expenses incurred and delays caused by extra handlings from warehouse to freight car and from freight car to ultimate destination. Several other factors contributed to make prompt delivery impossible, including the switching and side-tracking of freight cars containing less than carload lots.

Observing manufacturers in other fields profiting by truck service, especially during a period of extensive "hand-to-mouth" buying, they turned to this form of transportation as a solution to their own shipping problems. Small and large orders were filled as the flexible commodity haulers made semi-weekly,

* *Vice-President, Commercial Car Division, National Automobile Chamber of Commerce.*

and in some cases more frequent trips, directly to distribution points after they were loaded with merchandise at the place of production. Inventories were reduced considerably and manufacturers were brought into close touch with the individual needs of their customers.

Because of the unusual amount of wear and tear on the trucks during the last eighteen months in which period the purchase of new equipment has been at a subnormal rate there has accumulated a bank of consumers' demands which should speed up truck output with the livening of general business activity.

With a return to increased industrial activity, the motor truck will be more in demand than in the past. It has already proved itself an economic necessity in the short haul. The demand for the truck in this field will increase with the speeding up of production. "Hand-to-mouth" buying will be the order for some time in the future because of its many advantages.

The truck has proved the economical hauler for these small lots. The agricultural field will extend its use of the truck because of its benefits in the movement of perishable fruit and vegetables, which must be turned over promptly to prevent spoilage.

Thousands of persons will be employed and hundreds of motor trucks will be used in connection with the federal and state highway programs. When the roads are completed, more shippers will purchase trucks to use on them whenever it proves economical.

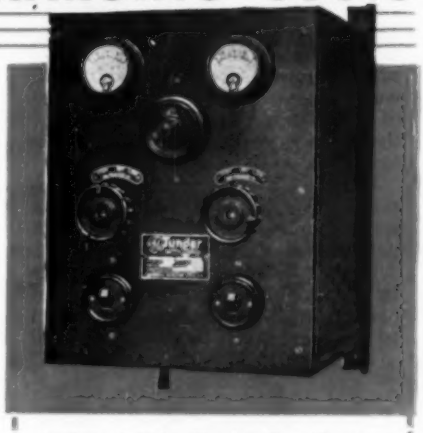
Although the foreign sales of American-made trucks, in keeping with the general business trend, dropped from 338,929 in 1929 to 191,000 during the past year, the future in this field looms bright. Use of American trucks in foreign countries multiplies rapidly as financing them is comparatively easy because banks recognize their essential usefulness in promoting prog-

(Please turn to page 12)

An excellent example of truck progress in 1930. The aluminum bodies reduce dead weight; the use of six wheels on both truck and trailer, together with dual pneumatic tires, permit carrying greater payloads; the trailer advantages are obvious.

TUNGAR

CUTS YOUR CHARGING COSTS



ARE you still sending batteries "down the street" to be charged—because "75 cents isn't high"···because it's "too much trouble" to charge them yourself ···because you "have no battery experts"?

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Anyone who knows a negative terminal from a positive can operate Tungar. You don't need any engineers around.

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ress. Rapid expansion in truck-use will take place for a number of years in Australia, South America, China, India, South Africa, and other sections where the truck, to some extent, has already revolutionized the transport problem because of the great areas and sparse population which could not be covered by a network of railways.

Despite repeated statements to the contrary, the motor truck pays a just share of taxes. The average common carrier truck is paying $459 annually for use of the highway. Thirty-two states impose additional taxes on common carrier trucks based on gross receipts, additional weight on tires, percentage of value of produce carried, a percentage of the gross income or a ton mileage tax.

Despite the fact that they represent only 13 per cent of all highway vehicles, motor trucks pay 28 per cent of the highway taxes.

Research undertaken cooperatively by truck chassis, equipment and parts manufacturers has contributed to the more efficient and economical use of motor trucks in materials' handling. Among the contributions are:

The adoption of sleeping compartments in truck cabs—a 1930 development.

The trend toward the use of balloon and pneumatic tires multiplied in 1930

The use of aluminum and alloy metals in body construction, reducing the truck's dead weight and increasing payload 2,000 pounds on an average; devices for chemical or mechanical heating and refrigerating, permitting transportation of materials under regulated temperature conditions; bodies and appliances for the safer movement of combustibles and explosives; improvements in appliances for the preparation and mixing of concrete and other plastic building materials in transit; bodies and equipment to expedite and to simplify the loading and unloading of vehicles, including conveyors, improved side and rear dump-truck hoists and cranes for handling container-car units.

The trend toward the use of balloon and pneumatic tires multiplied during the past year and records show that all but four per cent of the trucks manufactured in 1930 and pneumatic tires as standard equipment. The motor trucks' op-

(*Please turn to page 65*)

BUILT FOR HEAVY-DUTY HAULING

Inspection of their powerful engines, alone, quickly proves how sturdy, how modern, how thoroughly "all-truck" Dodge Heavy-Duty Trucks actually are. And beneath the clean-cut, rugged exterior of one of these 96-horsepower engines are full force-feed lubrication, 100-pound crankshaft, 7 bearings, crankcase ventilator, aluminum-alloy pistons and many other features that insure power, dependability, low cost and long life.

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THE COMPLETE LINE OF DODGE TRUCKS RANGES IN PAYLOAD CAPACITIES FROM 1,200 TO 11,175 POUNDS—PRICED, CHASSIS F. O. B. DETROIT, FROM $435 TO $2695, INCLUDING 1½-TON CHASSIS AT . . . $595

DEPENDABLE

DODGE HEAVY DUTY TRUCKS

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MAINTENANCE PROBLEMS of the FLEET OWNER

By A. Geo. W. Brown*

CONFRONTING every operator is the problem of maintaining his vehicles. Experience has shown the soundness of systematic inspection coupled with unit replacement of parts. Otherwise vehicles will not perform their daily appointed tasks with the regularity demanded of them.

Good maintenance demands, more than anything else, an organization headed by a man who knows service requirements and their relative costs. Such a man is conscious that maximum economy in operation can only be achieved by a carefully planned maintenance program. Five factors control the success of this program.

1. An adequate place in which to work and which must be kept clean if satisfactory workmanship from mechanics is to be realized.

2. A knowledge of the operating conditions and physical ability of the equipment, its merits and shortcomings.

3. A knowledge of how to handle men and direct them along a carefully planned system of procedure.

4. Adequate shop equipment and tools, in keeping with the volume of work, to conserve man power.

5. A knowledge of operating and maintenance costs that will indicate when the ideal in maintenance is approached.

Carrying out a program of this kind does not of itself mean that all repair work must necessarily be done in the owner's own shop. It does mean that only such work as can be done best and at the lowest cost should be performed there.

Allied with any adequate maintenance program is the question of

---

* *Automotive Engineer, Borden's Farm Products Company, New York City.*

with the NEW

Firestone

TYPE "R" continuous base RIM

Tire changes are quickly made. The improved lock ring is easily removed with a screw driver or tire tool—it retains its shape—seats perfectly and is *always visible*. It positively locks the tire on the rim. The mounting bevel of the type "R" Rim is standardized for all types of wheels. Specify Firestone Rims for

SAFETY · DURABILITY · STRENGTH

lubrication. Without proper lubrication the life of even the best quality parts is so shortened as to reflect adversely on their value. It is said, and with much truth, that proper lubrication in itself, solves half of the maintenance problem.

No one will hazard the advice, however, that a universal lubricant or a standardized greasing program will produce uniform results throughout the industry. On the contrary, each carrier is faced with the necessity of developing his own program, a program that will produce the best results at a minimum cost for his particular operation.

Life records of unit parts must be known if the objective—ideal maintenance—is to be approached.

Man-hours required to do a job must be carefully studied at frequent intervals, if labor costs for unit overhauls are to be reasonable.

Full advantage must be taken of suggestions made by the workmen themselves, and the value of cooperating with shop equipment manufacturers in the interest of reduced costs cannot be overlooked. What goes on in the shops and garages is of the utmost importance to the entire operation.

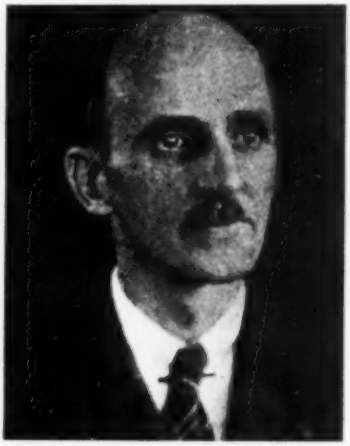
Good maintenance means longer life of unit parts and more efficient vehicle performance. Good maintenance builds *esprit de corps* among the drivers, improves customer relations and livens up the operation generally, all to the financial benefit of the company.

Well-appointed garages equipped with the "last word" in shop equipment are not the whole answer to the problems of maintenance. And, by the same token, special brands of fuel, oil, tires, batteries—to name a few of the innumerable supplies needed to carry on daily delivery—are not the sole solution to the problem, "how well" and at the same time "how cheaply" can vehicles be maintained. All of these are incidentals—the physical tools to carry on the job.

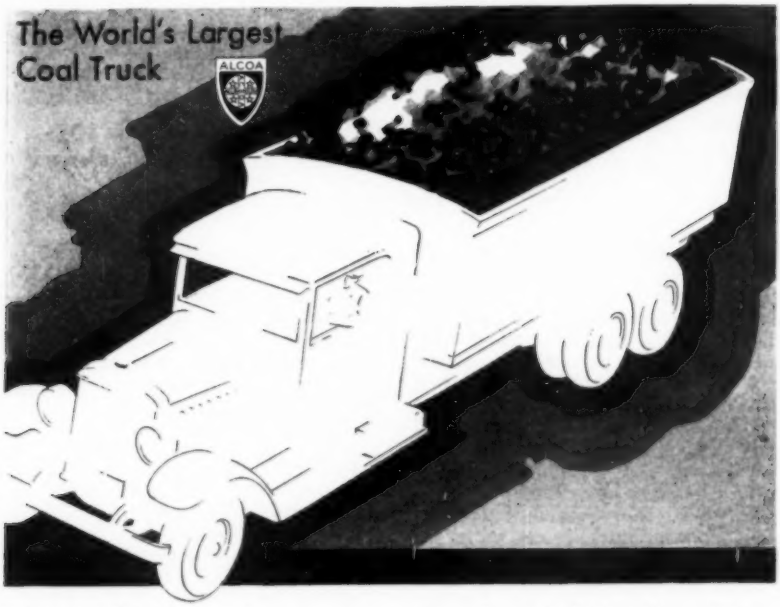
However, it takes more than good tools to be successful in maintenance. Much depends on a carefully planned course of action—a plan which must be cut to fit the need of each particular organization. There is no universal yardstick for maintenance—at least not yet.

Thus it is impossible to outline a detailed plan equally applicable to all organizations. I do, however, believe there are firm basic principles which may be called the fundamentals of maintenance. I am 100 per cent in favor of better shop facilities for the reason that only in a well-equipped shop is it pos-

(Please turn to page 60)



A. Geo. W. Brown



The Alcoa Aluminum Body Added a Ton to Pay-Load

Aluminize truck bodies! It is good business for operators; it brings new business to body builders. Here is one example:

40,000 pounds was the legal gross weight limit for a truck. The law did not specify what proportion should be pay-load. The Seaconnet Coal Company, of Rhode Island, used an Alcoa Aluminum body; built the world's largest coal truck. This huge truck now hauls 2,025 pounds more coal every trip. On an average eight-hour schedule it can earn six dollars more daily—in 300 working days $1800.

This body costs $533 more than a body made of heavier metals, but can earn an annual return of 337%. Such savings were practical only through the use of the light, strong alloys of Alcoa Aluminum, weighing only one-third as much as structural steel, yet equivalent in strength.

Structural shapes and sheets of the light, strong alloys of Alcoa Aluminum, standard for truck bodies, are carried in stock. Also plates, rivets, bolts and screws.

Write for the booklet, "Alcoa Aluminum for Truck Bodies." It contains engineering drawings and data for building various types of bodies. It also has performance and weight-saving data on many Alcoa Aluminum alloy bodies now in use. ALUMINUM COMPANY *of* AMERICA, 2461 Oliver Building, PITTSBURGH, PENNSYLVANIA.

ALCOA ALUMINUM

Gasoline Economy *in the* Shop

How Careful Supervision of the "Human Element" and the Adoption of Improved Gasoline Measuring Sticks Effected Great Fuel Savings

By Cal Fleace*

GASOLINE economy should be studied from all the various angles in the fleet operator's garage and shop, irrespective of whether the building is one for storage only or for storage as well as repairs and maintenance. This article is offered as the result of a study made, which reveals several wasteful methods and outlines some interesting and valuable solutions to the problems of needless waste.

In many shops gasoline is considered by practically all employees as a general utility fluid and not merely as the power agent, or fuel, for the gasoline-powered vehicles. The writer, himself connected with the maintenance of a fleet, has in this study noted and observed each source of waste and has corrected those coming within his jurisdiction and made further recommendations to the "officials" with regard to others, all with the idea in mind of decreasing gasoline consumption in general, and increasing the daily "mileage" of each vehicle.

Starting with the receiving of the gasoline from the delivery truck of the oil company, to the storage tank inlet at the street curb, and thence into the storage tanks on the premises, we found that little interest was centered in the *actual* number of gallons delivered. A garage employee of little education and perhaps more interested in having a smoke, usually signs the delivery receipt (in many operations), not knowing whether the full consignment is actually being delivered to his employers. *(No reflection on the fuel companies intended*—Editor).

In our particular case a duplicate copy of the delivery receipt is turned into the garage office and the number of gallons receipted for is entered upon the monthly balance sheet. This receipt is then further certified by the garage official's chief clerk and passed on to the cashier or general office for payment, when due, for the gasoline supply received.

Following up the actual dispensation or distribution of the gasoline, we find that it is either forced or pumped from the storage tanks on the premises, directly into the vehicle tanks, and sometimes into a portable, fifty-gallon tank, to be subsequently pumped into the various vehicle tanks. At the time of filling such tanks, the number of gallons required per vehicle is entered on a tally sheet by the employee assigned (or others unassigned) and the sheet or sheets are then forwarded to the office, where the number of gallons are charged directly to each vehicle, and the total disbursements for the

* *Fleet maintenance man; name and address of company were not given.*

day are deducted from the balance sheet.

Thus, by careful accounting, and providing exact balancing (juggling) at all times, "peace" is usually kept in the company with the idea of eliminating investigations and the necessary explanations of overage or shortage that cannot very well be laid to evaporation loss alone.

Figuring conservatively and considering the methods used in the average fleet garage, we find that the gasoline sloppage (careless spilling) from the storage tank to the vehicle tank, etc., can sometimes be as high as one-half to one pint per vehicle per day, and sometimes more, and particularly where no measuring device is used to guide the person filling the tank. In many garages the old "five, ten and fifteen" gallon method still reigns supreme, usually including the filling of the tank up to the brim, or running over, and then replacing the filler cap.

The foregoing are the writer's observations on gasoline wastage in the shop and the following are the methods we have adopted to curb this needless waste. Realizing that the blame lies largely with the "human element" we found our idea to assist the human element in practicing economy not only by constant lecturing, but by providing him with a more practical means of dispensing and recording the dispensation of gasoline for our trucks.

The first change that we made was to furnish for each truck a measuring stick or ruler, with the number of each truck prominently marked thereon. Each ruler stays in the cab of each truck at all times. The ruler itself, a rough sketch of which appears on this page is

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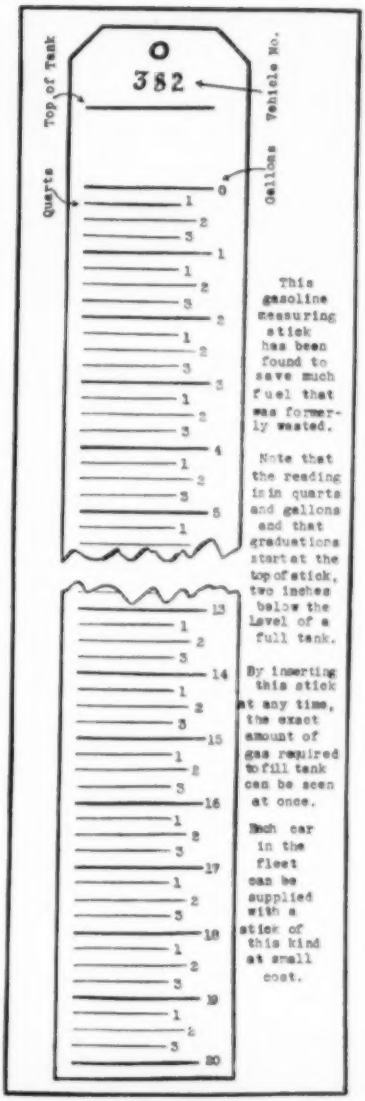


Maintaining *a Small* Fleet

Describing the Operation and Maintenance of a Fleet of Ten Tractor-Trailers and Eight Trucks

By **H. J. Lamack***

THE operation and maintenance procedure of the fleet of the Express Transportation Company, which runs between Chicago and Detroit, should prove of interest to those readers of this publication in the trucking business having a fleet of similar size.

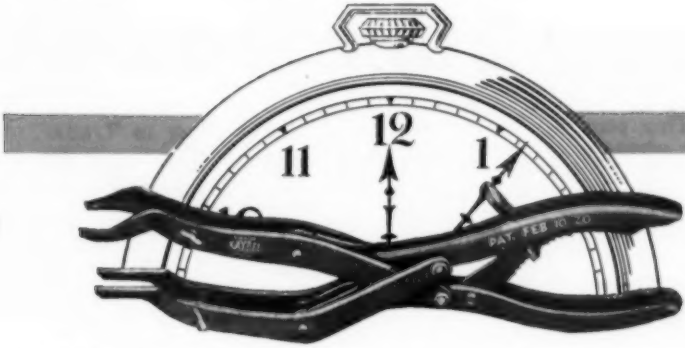
We operate ten "highway units" or in other words, tractors with two trailers each, as shown in the picture at the head of this article. We also have eight local units, consisting of various sized trucks for pickup and delivery at our two terminal stations. These are continually rolling, going into the garage only when absolutely necessary, to effect repairs. Due to the close inspection that these trucks receive daily, no regular frequency of maintenance is followed. Approximately 75,000 miles per month are totalled up by the entire fleet.

From our records of maintenance, it is revealed that brake adjustment and tire troubles constitute the most common of the minor repair jobs. This is easily accounted for, when we point out that between 2,200 and 2,500 tons of merchandise are handled every month.

Crankcases of these trucks and tractors are drained at least once every 1,800 miles, at which time the transmissions, differentials and other points are checked and lubricated. The engines of each vehicle are overhauled completely at about every 30,000 miles. Tires, most of which are 9 x 20 inches, are watched closely for proper inflation and also examined for minor cuts, bruises and "buried" metal, glass, etc. Some of our tires have already run 60,000 miles.

We operate our own shop for all minor repairs and the only outside

* *President, Express Transportation Company, Detroit and Chicago.*



The K-D keeps pace with the clock because it's built as well

IF you've a fleet of cars of various makes, you'll find the K-D No. 600 Adjustable Valve Lifter will take care of 90% of them. It *fits* the new motors with low ports and raises the valve spring to its full height. It's sturdy, rigid, swift and sure.

The four K-D Lifters shown here will service your entire fleet. Your shop equipment isn't complete for fast work without them.

Write for Folders on these and other K-D Tools.

K-D MANUFACTURING. CO., *Lancaster, Pa.*

work that is done consists of the large overhaul jobs, which are frequently handled by the truck manufacturer's or dealer's service station. This plan has proven economical, when considering the average cost for a yearly period.

The service station of the company is equipped to handle the jobs described and by exercising promptness on each bit of repair work the maintenance cost is held down to what the company believes is a minimum.

Seasons of the year cause the upkeep cost to vary somewhat, even though all of the roads encountered between the two cities are paved and level, with the exception of the Irish Hills district through which the route passes when emerging from the city of Detroit. This strip of about 60 or 70 miles winds through low rolling hills that are easily negotiated. Most of the grades on these roads do not exceed six or seven per cent and do not cause any long heavy pulls.

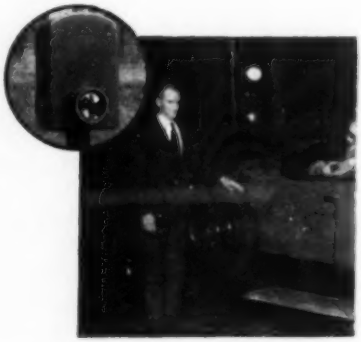
West from the edge of the Irish Hills district are paved roads that run through the farming district of lower Michigan and when the line is crossed into Indiana and around the lake, it is very smooth and level.

Here and there, however, are slightly rough streets of the south and east Chicago industrial districts where bricks are used extensively and many stops must be made for traffic lights, which of course increase gasoline consumption and are rather hard on such units as brakes, clutches and transmissions.

The illustration accompanying this article shows one of the "highway units" which consists of a tractor, a semi-trailer and trailer. These particular ones are refrigerated body types and sometimes ordinary freight and van bodies are used. Both types are operated by this company.

Saves Time in Traffic

THE light that "sees" automobiles as they approach the intersection of South and Coal streets, Wilkinsburg, Pa., and turns on the green signal to go is demonstrated by Dr. Phillips Thomas, of the Westinghouse Research Laboratories, who designed the light.



This installation, believed to be the first of its kind in the world, is an adaptation of the famous photo-electric cell.

In operation for over six months, it is heralded by local residents as a great boon to traffic because it eliminates the time wasted by the driver of a car or truck in the side street while waiting when the main arterial street is clear, for the light to change to green. Usually, the light on the main arterial street is green, speeding traffic. With cars on both intersecting streets, the green and red signals flash on a predetermined time schedule, as do ordinary traffic signals.

AVOID BLIND DRIVING

IN BAD WEATHER!

Old Man Winter in a tantrum . . . Sleet, snow, icy driving rain! . . . In dangerous winter weather a Protex Sleet-Proof Windshield guarantees the safety and comfort of clear vision!

The Protex Glass Company has evolved a practical and economical method of electrically heating glass by connecting special nichrome wires embedded in Protex Glass to the storage battery. This raises the temperature of the glass sufficiently to prevent ice from forming, or snow from sticking.

The attachment is simple, and consumes a negligible amount of current.

This new Protex Windshield offers permanent protection against flying glass as well as special protection in bad winter weather.

Protex GLASS for SAFETY

Write for descriptive literature

PROTEX GLASS COMPANY

220 FIFTH AVENUE NEW YORK, N. Y.

Truck Tires

Some Hints on Their Care and Handling

By L. W. Fox*

THE basis of successful and economical tire operation starts with selection of the original tire equipment.

The firs. question that comes up is that of tire size. It is very important that sufficient tire capacity be applied to handle the pay-load plus the empty vehicle. It is an easy matter to determine the wheel load. If the loaded truck is available, it may be run on any commercial scales obtaining the load on the front axle and then the rear. The sum of these two may then be checked against the total weight. If the loaded vehicle cannot be obtained, it is possible to obtain axle weights of the empty vehicle, as above, and then distribute the pay load according to the following simple formulae.

$$\frac{B \times \text{Pay-Load}}{\text{Wheel Base}} = \text{Pay-load on front axle}$$

$$\frac{A \times \text{Pay-Load}}{\text{Wheel Base}} = \text{Pay-load on rear axle}$$

B is distance from center of pay-load to rear axle. A from center of load to front axle, and wheelbase from front axle to rear axle. The front and rear axle weights thus obtained are added to the weights of the empty vehicle.

There are, quite frequently, cases of the center of the load being behind the rear axle. Obviously, such loading tends to lift the front axle off the ground and if carried far enough back will actually lift the front end. Any reduction in front axle load because of such construction is added to the rear axle. This design seems to be quite prevalent in the small panel body trucks, and is aggravated by loading toward the rear of the body, for convenience.

It usually happens that the front wheel loads do not require the same tire size as used rear. It is usual practice, however, to apply the same size tire front as the rear, thereby providing interchangeability and necessitating but one spare.

Tires should be applied to the rims for which they were designed. Rims are purchased once for the life of the truck and the extra cost of a size larger rim may be paid for many times over through greater tire mileage and less trouble. A tire cramped into a small rim is reduced in air volume, and therefore,

* *Sales Engineer, Firestone Tire & Rubber Company, Akron, Ohio.*

Here's the GUIDE to *Correct* Motor Lubrication

A VERY useful and profitable guide to everyone interested in motor lubrication from the standpoint of better motor performance and longer wear.

"A Practical Test for Viscosity" explains the important factors in motor lubrication, especially viscosity. It gives a scientific solution to the problem of testing the lubricating value of motor oil continuously and while the motor is running.

If you are on the lookout for proven ways to get better performance out of the motor, more power, greater mileage with a minimum of fuel and motor-wear, send for "A Practical Test for Viscosity".

This free booklet is concisely written, with a thorough knowledge of modern lubrication methods . . . Sent to you entirely without obligation. Write to the Visco-Meter Corporation, 318 Grote Street, Buffalo, N. Y.

The VISCOMETER

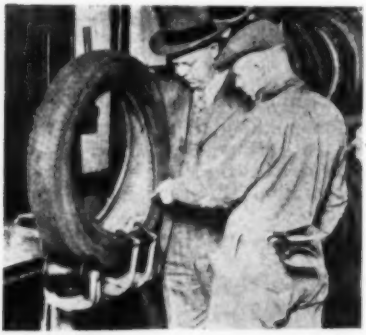
Takes the Guesswork Out of Motor Lubrication

carrying capacity. In addition, its base is narrowed, causing more side rocking, excessive flexing and possible failure.

For truck operation it is far better to use only heavy-duty tire construction, even tho there may be tires of a similar size available at a lower cost. The reason for this recommendation is that the heavy-duty tires are constructed with heavier beads, heavier carcass and heavier treads, all designed to meet the demands of heavy commercial service.

Care of the tires, after having settled upon the type and size, is largely a matter of organized and scheduled service. Too much stress cannot be given to proper inflation. This should be a regular scheduled service as no single phase of service means as much, or is as large a factor in low tire costs and continuity of operation. The inflation recommendations of the tire industry should be followed.

It is a little difficult to lay down a schedule of inflation as it depends upon the severity of operation. Tires should be inflated at least once a week. There are cases where tires are checked every trip because of particularly severe conditions. Twenty percent under recommended inflation causes a loss of 30 percent in tire mileage, as well as possibility of tire trouble due to excessive flexing.



Every time a tire is off the rim, it should be inspected.

Early repair of small breaks will considerably lengthen tire life.

Where dual tires are used it is especially important that the inflation be kept the same in order to avoid one tire carrying more than its share of the load. There are some operations over heavily crowned roads where it is necessary to carry 10 percent above recommended inflation in the outside dual tires in order to equalize the tire loads. This is not resorted to unless the wear of the inside tires indicates such a move to be necessary.

Proper mating of duals is important, again to equalize the loading. New and completely worn tires should not be mated because of the difference in overall diameters. If new and partially worn tires are

(Please turn to page 66)

Gun Alloys

OUTLAST ORDINARY BRAKE DRUMS

4 to 5 times

"IN THE MATTER of brake lining" writes the PURITY BAKERIES Inc., Rush Street, Chicago, Ill., "we find with our fleet of 2257 TRUCKS woven brake lining in combination with LEMPCO BRAKE DRUMS give best results on both internal and external brakes . . . so far we have never had to replace the above mentioned drums."

On a 2257 truck fleet Lempco Drums must be effecting an enormous saving per year in maintenance costs. For Lempco Drums outlast ordinary drums 3 to 5 times—increase brake lining life 200% to 300% thus eliminating 75% of all brake adjustments. That naturally is the reason why the Purity Bakeries Inc., use Lempco Gun Alloys on their vast fleet in preference to any other. You'll also standardize on Gun Alloys after proving their merits on one Vehicle. Order from your nearest Lempco distributor.

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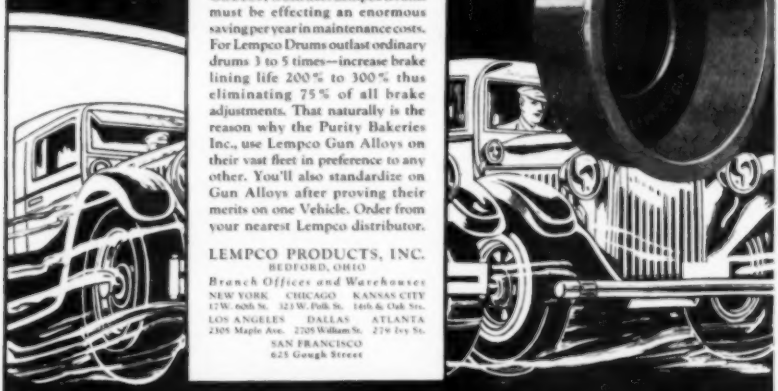


LEMPCO GUN ALLOY BRAKE DRUMS

Servicing B.&B. Clutches

Borg & Beck's Service Manager Gives Us Another Service Article on Maintaining Clutches

By C. C. Blanchard

CLUTCH facings are bound to wear down and when they do, the clutch must be efficiently serviced and parts replaced to forestall any serious effects in operation of the automobile, truck or bus. A slipping clutch, with loss of, and sometimes complete failure of power, is the usual result.

The single plate, dry disc type of clutch is possibly more widely used than any other. The information contained in this article is confined to Borg & Beck "R" and "RD" types. These are non-adjustable with several thrust springs. The "R" types are made for use in fly-wheels in which a recess is machined for the clutch (Fig. 2), while the "RD" types (Fig. 3) are used on flat fly-wheels, the clutch cover being made in the shape of a housing in which other parts are enclosed.

A—Description

ALL parts of the clutch (Fig. 1) are locked to the flywheel and rotate with it when the clutch is engaged, the driven plate (2) and the shaft coming to rest when the clutch is released. The release bearing and its mounting are attached to the transmission.

Release is accomplished by moving release bearing forward against the inner ends of release levers (5A) when a ball bearing is used. When a graphite bearing is used a bearing plate (14) is attached to inner ends of the three levers. The three release levers (5A) are mounted on the clutch cover (9), the outer ends of the levers bearing against three release pads (23) which are bolted to the pressure plate (4).

Several small coil springs (7) and spring cups (7A) are assembled in the cover (9) which bolts

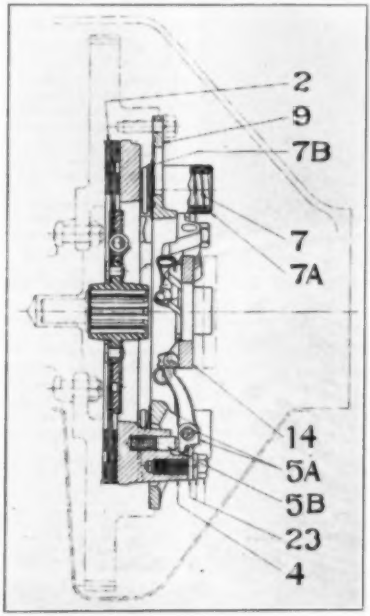
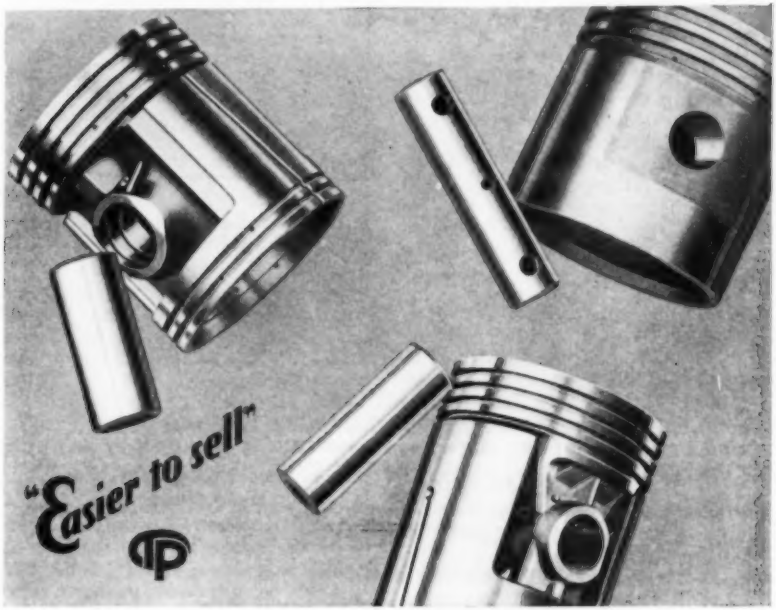


Fig. 1—Diagrammatic view of a typical clutch assembly. Note the operation of the release levers (5A).

Here's FOOD FOR THOUGHT



You buy tires on a mileage basis. But do you *always* look at repair work the same way? For example, pistons worn loose in the cylinders may get by for a while if you fit them with new rings. But soon you'll have the expense of another tear-down for the same repair. Which is cheaper per mile: frequent patch-work, or new, long-lasting pistons and pins?

When you replace, get the benefit of pistons and pins backed by the makers of the famous Thompson Valves.

THOMPSON PRODUCTS, INCORPORATED

General Offices: Cleveland, Ohio, U. S. A.
Factories: CLEVELAND and DETROIT

Thompson Valves and Guides; King, Shackle, Tie Rods Bolts and Bushings; Eccentric Tie Rods; Pistons and Pins; Tryon Shackles.

Thompson Pistons

Always use Thompson Pins with Thompson Pistons

to the flywheel. The springs are compressed between the spring cups and pressure plate, thus providing the necessary driving pressure. Spring insulators (7B) are used, in some cars, between springs and pressure plate to protect springs if pressure plate should become excessively heated.

When the clutch pedal is pressed down, the release bearing in turn pushes the inner ends of the release levers forward. The outer ends of the release levers moving to the rear pull the pressure plate away from the driven plate assembly (2), permitting a positive clean release.

When the foot pressure is removed from the clutch pedal the clutch springs force the pressure plate forward against the driven plate, gradually and smoothly applying the power of the engine to the rear wheels.

As the clutch facings wear, the pressure plate (4) moves closer to the flywheel face and the outer ends of the release levers follow. This causes the inner ends of the levers to travel farther toward transmission and decreases the clearance between the release levers and the release bearing. The effect on the clutch pedal is to decrease the clearance or free travel under the toe board, which is the

Fig. 2—The "R" type of clutch is used in recessed flywheels.

Fig. 3.—The "RD" type of clutch is used on flat flywheels, the cover serving as a housing.

distance the pedal moves away from toe board before the release bearing comes in contact with the release levers. Some clearance must *always* be maintained to prevent clutch pedal riding on the toe board, and thus causing clutch to slip. This clearance is restored by adjusting the clutch pedal.

B—Adjustments

ALL cars provide one or more adjustments on the clutch pedal and pedal shaft and these should be adjusted in accordance with instructions supplied by each vehicle manufacturer. In general proceed as follows:

1. Shift the pedal down away from the toe-board until clearance or free movement is one to one-and one-half inches. The pedal pad should come in contact with toe-board when the pedal is pressed down. If it does not move that far, making it necessary to spring pedal to make pad touch toe-board, shift pedal down a little more.

2. Press pedal down and note distance release bearing travels after it comes in contact with release levers. To obtain a clean release, the levers should be pushed toward the flywheel 5/16 in. for 9R and

300 Miles Per Day— Every Day in the Week

This Model 220 truck is one of a fleet of 22 Brockway trucks, powered with Continental Motors, in the service of Frank Seeley, contract hauler of Norwich, N. Y. There are two of these new Model 220's in this fleet, both of which are hauling for Victory Chain, Inc. These two trucks operate all day and night every other day and average 250 to 300 miles every day in the week.

Continental "R" series valve-in-head Engines are used by the best truck manufacturers in the country. This series ranges in horsepower from 45 to 100. Interchangeable parts in the "R" series mean time and money saved for the truck owner, and permit keeping all of his trucks on the road all of the time. Continental builds to the manufacturer's needs—for the consumer's satisfaction.

CONTINENTAL MOTORS CORPORATION

Offices: **Detroit, Mich., U. S. A.** ***Factories:*** **Detroit & Muskegon**

Continental Engines

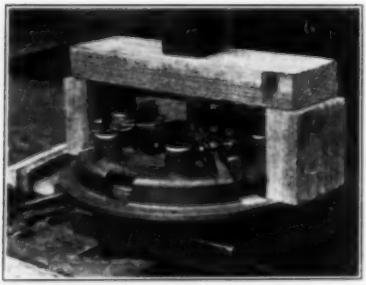


Fig. 4—Compressing the clutch spring in an arbor press facilitates disassembly. Any type of clutch can be taken apart in this manner.

9RD, 3/8 in. for 10R and 10RD. If it does not travel that distance, shift pedal up, bearing in mind that pedal pad must touch toe-board as above.

Clutch Removal and Disassembly

TO remove the clutch it is necessary to remove the transmission assembly. After the transmission has been removed proceed to remove the clutch as follows:

1. Remove all holding bolts, which will permit cover assembly to be removed from flywheel.

2. The driven plate remains in flywheel and can now be removed.

3. Further disassembly of the clutch cover assembly can be made by compressing the springs in an arbor or drill press. Place the assembly on the table with pressure plate resting on a block, as shown in Fig. 4, then by using three blocks to form a bridge, the clutch springs can be compressed. While it is being held in this position remove the three release pad screws, after which the pressure can be gradually released so as to prevent clutch springs from flying.

D—Inspection

FACINGS should have a thickness of not less than 3/32 in. If less than this thickness new facings, or preferably a new driven plate assembly, should be installed.

The cost of a new driven plate assembly complete is so low in comparison to the labor cost in removing it that it is better in most cases to avoid troubles incident to removing old facings and applying new ones.

If the plate is bent or the facings incorrectly applied so that they do not lie flat, the clutch may not release or may be so rough that it will have to be torn down again to correct the trouble, which would add expense far greater than the difference in cost between facings and labor applying them as compared with a new driven plate assembly.

No individual lever adjustment is provided but all are very closely checked for interchangeability. Worn levers and pins should be replaced with a set of three new levers and pins. Satisfactory clutch action cannot be obtained if one new lever or pin is used in the same clutch with worn levers and pins.

Worn release pads should be replaced with a set of three new ones.

Inasmuch as the spring pressure varies in different cars it is best, when in doubt, to install a set of new springs.

For reassembly or reinstallation of clutch, the following six steps should be followed carefully:

1. To reassemble the clutch, reverse the procedure given for disassembly as outlined in paragraph "C." Be sure that release pad screws (23) are securely tightened.

2. Pack a teaspoonful of vase-

(Please turn to page 63)

Operating Costs?

By actual comparison with other makes, ***Burgess-Norton Piston Pins*** and ***Valves*** and ***Dall Pistons*** have conclusively proven they will reduce operating costs.

The ***Dall*** line of Pistons for Trucks and Buses is complete. And for every ***Dall Piston*** there is a ***Burgess-Norton Piston Pin.***

A catalogue of information, the most complete listing of Pins and Pistons ever published, is available to your service manager. A note on your letterhead will bring it.

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These six Branches Insure "Overnight Service Everywhere"
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A Few Interesting Answers to the Radiator Question

"Flushing of radiators and cooling systems is a very good plan; we do it in the spring and fall. By using air and water pressure and reverse-flushing, we find that our time and trouble is well paid for. In extreme cases, a scale and rust solvent has to be used. Prestone anti-freeze is used wherever the cooling system is in first class shape. As our climate is very changeable, even in midwinter, when the temperature will go above freezing and within a few days below zero, once the equipment is serviced with this anti-freeze there is little worry of a freeze-up. While alcohol is a good anti-freeze, it requires more attention on account of evaporation and one can never feel sure after a few warm days, that the solution will not freeze at a given temperature."—*R. Mason, Garage Superintendent, Kansas City Gas Co., Kansas City, Mo., operating a fleet of 70 trucks and 30 passenger cars.*

"Four times a year we flush out the cooling systems, using a hose in the radiator with the motor idling and all drains and cocks open. We find this to be quite effective. We are using alcohol as an anti-freeze because it is inexpensive and won't matter if we waste it when changing hose connections or repairing leaky radiators. We use radiator shutters and cardboard shutters on our older equipment.—*B. F. Weber, Supt. of Maintenance, Columbia Terminals Co., St. Louis, Mo., operating a fleet of 130 trucks, 110 tractors and 11 passenger cars.*

"We flush the cooling systems about every 25,000 miles, using a chemical solution which is later washed out with clean water under pressure. We find that this materially helps performance. We use Prestone anti-freeze in passenger cars and trucks only. Clear water is used in the busses. We find it helps to use radiator shutters."—*F. A. Quackenbush, Supt., Crandic Stages, Inc., Cedar Rapids, Iowa, operating a fleet of 45 busses, 10 trucks and 9 passenger cars.*

"Every March we flush the cooling systems of our vehicles, using the time-honored soda method. We find that periodical cleaning of this kind helps the general performance and prevents overheating. We use alcohol as an anti-freeze in our service cars, but do not use any in our heavy trucks as the drivers do not shut off the motors. Instead of shutters we use cardboard fronts on the bottom of the radiators and have experienced no troubles with freezing."—*S. O. Henzler, Delivery Supt., Wieboldt Stores, Inc., Chicago, Ill., operating a fleet of 82 trucks and 5 passenger cars.*

"We flush our cooling systems twice a year, using soda solutions with hot water. We find that this extra work pays, in eliminating road delays, etc. We use both alcohol and Prestone in our various equipment. Alcohol evaporates away, but it is o. k. if watched closely and checked with a hydrometer. Prestone, to our mind, is the safer way. We use radiator shutters on our equipment."—*J. E. O'Brien, Supt. Maintenance, Col. Gorge System, Portland, Ore., operating a fleet of 45 busses and six passenger cars.*

Question No. 9 is Timely—Your Cooperation is Urged

Question-*of*-*the*-Month Club

No. 9—What Work is " Farmed Out" to Other Shops?

Below are listed some of the important operations in connection with Fleet Maintenance. Please report which work is performed in your own shop and also that which is sent out to other shops, by checking in respective columns:

Character of Work	In Your Shop?	Farmed Out?
Battery Charging and Repairs	☐	☐
Brake Relining	☐	☐
Brake Drum Reconditioning	☐	☐
Body Repairs (General)	☐	☐
Body Building (Special)	☐	☐
Carburetor Repairs	☐	☐
Clutch, Transmission Repairs	☐	☐
Connecting Rod Rebabbitting	☐	☐
Cylinder Reconditioning	☐	☐
Electrical Unit Repairs	☐	☐
Engine Rebuilding (Complete)	☐	☐
Engine Repairs (Minor)	☐	☐
Fender Repairs	☐	☐
Frame, Axle Straightening	☐	☐
Glass Replacement	☐	☐
Greasing and Lubricating	☐	☐
Painting of Vehicles	☐	☐
Piston Ring Replacement	☐	☐
Radiator Repairs	☐	☐
Rear-End Overhauling	☐	☐
Speedometer Repairs	☐	☐
Spring Repairs, Replacement	☐	☐
Tire Vulcanizing, Repairs	☐	☐
Tube Patching	☐	☐
Valve Grinding; Refacing	☐	☐
Washing Cars, Trucks, Buses	☐	☐
Welding Broken Parts	☐	☐
Wheel and Axle Aligning	☐	☐

How many vehicles in your fleet?

.....Trucks; .....Busses; .....Pass. Cars; .....Taxis

Name of Firm .....

Address .....

City and State .....

Your Name .....*Position* .....

(Please tear out and mail to the Editor, The Fleet Owner, 90 West Street, New York)

Fig. 1—Crack marked out with chalk.

How to Weld Cracked Blocks

Bronze-Welding, Properly Applied, Will Save That Block from the Scrap-Heap

By G. B. Moynihan

BRONZE-WELDING, by the oxy-acetylene process, is a method now very frequently used for the repair of cast-iron cylinder blocks, because in many cases it can be done without removing the block from the car and without preheating it Regrinding can also be avoided by proper use of this welding method.

To apply this welding method correctly, and to avoid the possibility of spoiling a valuable block, the beginner should make a careful preliminary study of the procedure and have some practice in making this type of weld on pieces of scrap metal. The procedure generally recommended is to obtain a scrap block (6 or 8 cylinder if possible) and make several test welds in this before attempting to make bronze-welded joints on a block that is to be used again.

Bronze-welding jobs have in some instances turned out unsatisfactorily from the fact that the repair in question was the first attempted by the mechanic, who, instead of "knowing his metal," made the joint without any previous practice or experience. There are a number of very necessary precautions to be taken in this work and to be followed closely.

After obtaining a discarded cylinder block and making several test welds, the sections around the joint can be broken out with a hammer and examined to see whether proper adhesion and soundness of metal have been obtained. In this way the welder can experiment with tip sizes, amount of flux, methods of chipping or grinding, metal temperatures, and other variable conditions. It is a vital matter for these details to be settled before attempting to make final joints in cast-iron parts by bronze-welding.

The subject of dismantling is the first one to be considered. If pos-

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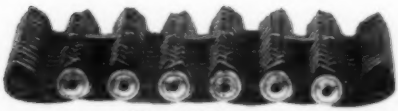
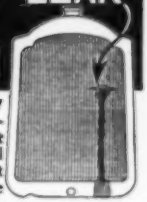
DUCKWORTH DIVISION
Springfield Massachusetts

DUCKWORTH



STOP THAT LEAK WITH SMOOTH-ON No. 1



YOU can apply Smooth-On with radiator full or empty, hot or cold, without removal from the car and without putting anything inside that clogs the circulation.

Merely roll the Smooth-On into a stiff putty, press it against and into the leak with your thumb or pack it into the defect with a knife blade or screw-driver, and scrape off the excess. The leak will stop instantly and the repair is permanent.

Cracked Water Jackets

Water jackets of automobiles, stationary or marine gas engines which have developed long or short cracks or have even had pieces broken entirely out from freezing can be made thoroughly and lastingly serviceable by similar repair, or by applying Smooth-On under straps or a plate.

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sible, the block should be removed, laid on a flat surface such as a table and bronze-welded where it is easily handled. If necessary, bronze-welding can also be performed on cylinder blocks in place, but usually considerable preparation to the engine and parts is necessary before the job can be undertaken. The cylinder head can almost always be removed and, whenever possible, this should be done, so that a complete examination can be made.

Remove the head by taking off the spark plugs and wires, unscrewing the bolts which fasten the head to the block proper. The head can be then taken off and put aside. If the break is in the cylinder head it can be welded on the table.

Cracks in cylinder blocks are of several types. Perhaps the easiest to repair are cracks which occur in the water jacket in the head. Besides this, cracks occur in the corners of the block, in the cylinder wall toward the center of the block, in the bottom part of the block, and

Fig. 2—With diamond point chisel and hammer.

Fig. 3—The vee is chipped out.

at times the cast iron arms which appear on some makes of engine. For the latter type of break, it is always necessary to take the block out of the car because even though no preheating is done, it would be impossible to support the block in line when it is under strain.

If the block is left in place in the car, special care should be taken to protect all other parts from damage which might be caused by the oxy-acetylene flame. Precautions should also be taken beforehand to prevent any possibility of marring the wood of the car or of injuring the vital parts of the engine. Asbestos fibre cement is very handy in protecting parts from the effect of the blow-pipe flame. A stiff paste can be made up from asbestos cement and water and can be generously used to cover any parts which may need protection. This paste should be used on painted surfaces or on solder so that these materials will not be harmed by heat of welding.

All gasoline should be thoroughly drained from the gas line, vacuum tank and carburetor; all wiring, oil, and gas lines and other parts of the ignition and lubrication systems should be carefully protected. As-

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¶ On page 35 is a form, ready to be filled out. Maintenance men are urged to co-operate in joining this new form of "club."

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¶ We would like to see every reader join. See pages 34-35.

The Editor

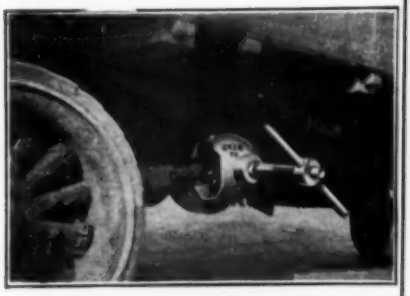

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Fig. 4—Cleaning the vee with a wire brush.

bestos paper should be used to cover up the parts which should be protected from the heat of the blowpipe, and so eliminate the necessity of removing them from the car.

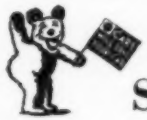
The water circulation system should be drained well below the level of the crack, and the cooling system vented so no pressure will be built up if the overflow pipe becomes clogged. It is a good plan to run the engine for a few minutes with the cooling system empty in order to preheat the casting slightly. This should be done carefully so that the engine may not be injured by overheating.

Chipping should be performed whether the block is in place in the car or whether it is removed and repaired on the table. When the block can be removed from the car it should be set upon a level surface, Fig. 1, and the crack carefully marked out for chipping. For this work a diamond point chisel is best and it should be sharp enough so that the edges of the vee will be clean and will take the bronze easily.

Every crack should be chipped out carefully to within about 1/16 in. from the bottom. (Fig. 2) There is no harm in chipping through because the hole will be filled up with bronze afterward. The vee should extend well beyond the visible end of the crack. (Fig. 3.)

One method of finding out how far the crack extends is to rub oil over the surface at the end of the crack and wipe off all excess oil with a piece of waste. If chalk is rubbed on the surface after this operation, it will absorb the oil from the crack and

Fig. 5—Starting to weld.



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the outline of the crack can be easily seen by the line of oil in the chalk mark.

A portable electric grinder can sometimes be used for this work. The vee should be at an angle of about 45 deg. After the vee has been chipped out, the sides of the metal nearby can be roughened up with a chisel or preferably with a file.

If a portable grinder is used for veeing out the crack, the metal

Fig. 6—Dip the rod in and— *Fig. 7—the flux will adhere*

should be ground bright ½ in. on each side of the crack. This will help clean off the metal and give a good surface for the bronze to adhere to. After chipping and filing has been completed, the vee should be thoroughly brushed with a wire brush (Fig. 4), and if possible washed with a little gasoline to make sure that all grease and dirt is removed from the walls before starting the welding.

A good quality bronze rod specially manufactured for this type of work should be used. Oxweld No. 10 bronze rod is found suitable in most cases. Brazo flux, manufactured specially for bronze-welding, should be freely used on the first attempts. The operator will gradually come to find out the required amount of flux necessary for this particular type of bronze-welded repair.

A considerable amount of the success obtained by this method of welding depends upon the proper location and control of the welding flame and the heat which it supplies. A neutral welding flame is always used for bronze-welding. It is better to use a slightly smaller tip than would ordinarily be used for the thickness of metal involved. Thus for metal ⅛ in. thick, where ordinarily a No. 5 tip would be used, a No. 3 tip might be selected for bronze-welding. This is done to prevent any possible overheating and cracking of the metal.

The blowpipe flame should be played on the metal around the break, bringing it gradually up

to the welding heat. To complete this gradual heating, the flame should be directed also for some distance around the break to expand the metal slowly so that the other parts of the block away from the break will absorb a share of the contraction when the casting and weld are cooling. The heat is finally concentrated on the end of the crack where welding is to begin.

If the break extends into the valve ports, or to any other edge of the casting, the progress of the weld should be toward this point. In other cases, the progress of the weld should be from the ends of the crack toward the middle and should also progress from any small branch cracks toward a central point.

Start the welding operation well beyond the visible ends of the crack or break (Fig. 5), because sometimes the fracture extends much further along on the inner surface of the block, and if not properly welded, the parts will break again at a slight strain.

Special care should be taken to align parts. At times the block can be left in place for some of the welding operation and then removed for the completion of the weld. In cars which have supporting lugs of cast iron, it is necessary to remove the engine from the frame before breaks in these members can be repaired. The metal in these supporting arms is usually fairly thick and for this reason should be chipped out on both sides to form a double vee for the welding operation.

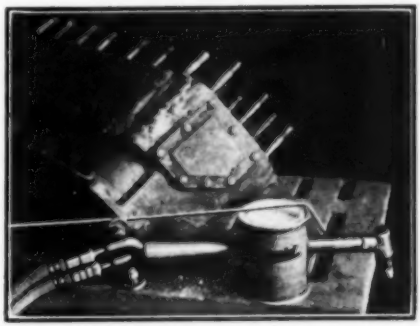


Fig. 9—After brushing off excess flux.

Fig. 8—The weld completed.

The metal in the vicinity of the cracks is first heated gradually as explained until it just barely commences to glow. Some welders make a practice of testing the heat of the metal with water or saliva; if it bubbles or boils, the metal is hot enough to start welding. The knack of securing best results in bronze-welding consists in keeping the metal at this uniform heat, allowing it to get neither too hot nor too cool.

If the metal should become too hot, the bronze weld metal will boil and form into drops which will roll off as fast as the

rod is added, and when the metal appears to be joined, it will be found that no bond has been obtained. If the casting is too cool, the bronze weld metal will be deposited but will not form a strong bond with the edges of the vee as it should.

Good "tinning" is most important. Tinning is a term used to indicate the action of the bronze which produces results similar to those obtained from the tinning operation in ordinary soldering. When molten bronze is applied to a clean, fluxed surface heated to the proper temperature, a thin layer of bronze will flow and spread out over the metal a little ahead of the main deposit. The flow will be free and natural, like water spreading over a clean, damp surface, and will not have the appearance of water on a greasy surface. The edge of the molten bronze will not round out like a bubble of mercury, but will tend to spread out over the heated metal.

The end of the rod is introduced into the flame while the casting is being heated, and the hot end is dipped in the flux. (Fig 6.) This will cause flux to adhere to the rod. (Fig. 7.) Then apply the flux to the heated spot. If the metal is at the proper temperature, the end of the rod will flow away and produce the tinning coating.

The bronze should be thoroughly tinned in the scarf of the vee and on the shoulder of the casting metal nearby. It is very important that the bottom of the vee should be well tinned and filled with bronze. The walls of the vee and the metal adjacent to the edges are tinned first so that after the bronze is added this inner layer of weld metal will be firmly bonded to the cast iron. After tinning a short section of the vee, the bronze-weld metal is built up until it fills the vee and spreads over the surface of the block about ¼ in. on each side of the section which had been chipped out.

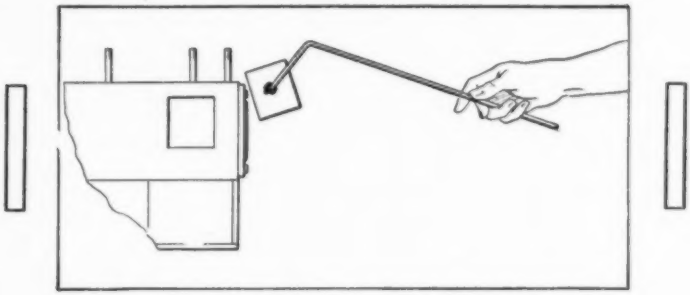


Fig. 10—Method of holding patch for tacking.

The rod should be brought into the flame approximately in line with the joint. The blowpipe should be held in such a way that the flame after striking the weld reflects so that it preheats the joint at some distance ahead of the puddle.

The puddle is gradually moved

(*Continued on page 61*)

Reducing *Idle* Time

New Powermatic Unit, Recently Developed, Speeds Truck Deliveries—Loads and Unloads

WITH truck manufacturers concerning themselves with how to get higher road speed, the Griswold Powermatic Corporation of Detroit, Mich., has attacked the trucking problem from the angle of greater delivery speed, as shown in the accompanying illustrations.

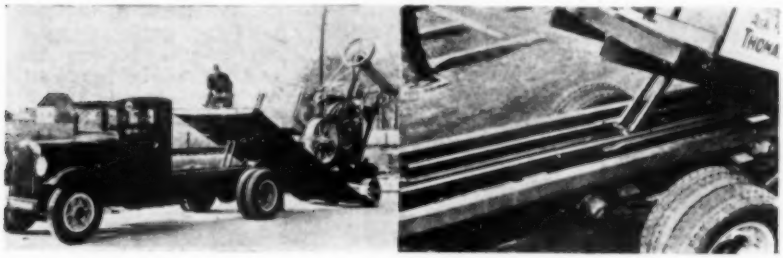
The Powermatic unit increases truck efficiency by reducing loading and unloading time, it is claimed. The unit operates directly from a conventional transmission power take-off without any necessity of the driver leaving his seat. It is capable of loading 5 tons and will unload 7 tons with ease, according to the makers. It is adaptable to all makes of trucks. Quick acting jacks at the rear of the truck frame relieve the truck axle of all unloading strains, it is further pointed out.

The Powermatic installation includes the power unit with gears running in oil, the long tool steel worm carried on frictionless thrust bearings, and the threaded crosshead that actuates the body-tilting mechanism. Massive I-beams, carried on liberal-sized rollers at the rear of the truck frame, take the place of the conventional body sills. To these I-beams the tilting mechanism is connected.

To operate, a lever in the truck cab is moved to engage the power unit. The idling truck engine furnishes ample power for practically all loads. Smoothly the body moves backward. As this movement continues, the rear edge of the truck body is lowered slowly to the ground while the front is elevated. As the load touches the ground, or loading dock, the truck is slowly driven a short distance forward.

The illustration shows this action clearly. There is no dumping, but instead the load is laid down in perfect order without jar or breakage. Fleet owners are invited to write for full details of this new unit.

By reversing this action the loading of heavy or bulky machinery, crates, boxes, timbers, steel beams and the like is facilitated. With the aid of a winch mounted at the forward end of the truck body the loading and unloading of heavy machinery is reduced to a one man operation.



Improvements in

Motor Trucks

New York Automobile Show Emphasizes Trends and Features of 1931 Truck Models

FOURTEEN makes of commercial vehicles and two makes of taxicabs were exhibited at the 31st National Automobile Show in Grand Central Palace last month. It was a thoroughly representative array and visitors interested in this section of the big exposition found many new features. Motor trucks have gone through revolutionary changes during the past few years and improvements in design in the last three years are more marked than the total changes made in the motor truck industry in the preceding fifteen years. The 1931 models show continued improvements in chassis units and other details, and how the engineer has designed a better chassis and a more reliable one.

Makes exhibited at Grand Central Palace included Chevrolet, Corbitt, Diamond T. Dodge Brothers, Federal, General Motors, Paige, Pierce-Arrow, Reo, Schacht, Stewart, Studebaker, Ward Electric and Willys. The taxicabs included Checker Cab and Dodge.

The slow speed four-cylinder engine is being replaced with the higher speed, more powerful, smooth operating six-cylinder power plant. Economical transportation, whether it be the delivery of raw material from the source of supply to the shipping point, or carting of the finished product, requires faster motor vehicles. Similarly, wholesale and retail trade units demand a commercial unit which will increase the number of deliveries in a working day or night, and at a decreased cost.

The development of the six-cylinder commercial car engine has been rapid, and it has been brought to a high degree of economical operation, maintenance and reliability since its introduction a few years ago. The power plants in general have the same design features as have marked the trend in the passenger car engine, such as crankshaft counterweights, torsion balancers, high-compression heads and better manifolding.

Marked improvements have been made in carburetors, designs making for easy starting and economical operation, for the average driver is prone to let the engine idle while he is making a delivery or a pick-up.

(Please turn to page 47)

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Fuel pumps are almost universal equipment, so that the correct supply of gasoline is delivered throughout the range of truck speed. High pressure lubricating systems have been adopted and oil filters and air cleaners are now almost standard equipment. Engine crankcases are ventilated and there is better control of the temperature.

Improvements have been made in other chassis units and in every detail the 1931 commercial car is better and more reliable than earlier designs. Clutches, transmissions, universal joints, propeller shafts, steering gears, frames, front and rear axles, demountable rims and wheels have been improved in design, so much so that protracted failure in service will be a rare exception under normal usage. Chassis lubrication has undergone

(*Please turn to page 63*)

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Relay *Announces* Duo-Drive

New Truck Has Two Eight-Cylinder Engines and Separate Drives to Two Relay Rear Axles

A STEP forward in truck transportation is seen in the announcement by the Relay Motors Corporation of Lima, Ohio, of a new dual-engine, six-wheel, heavy-duty truck which combines mechanical features, performance possibilities, and economical operation.

Driven by two engines, the new model, according to its designers, is the most powerful truck ever built and will carry bigger loads than have ever been possible in truck transportation, with greater protection to the highway over which it travels. It will be the fastest heavy-duty truck in existence.

The new truck is equipped with two straight eight-cylinder engines with combined brake horsepower of 275 at 2800 R.P.M. The power is applied to the drive in a radically new way. Each engine delivers power to a separate Relay rear axle. This idea of having two separate rear driving axles is entirely new in truck construction and is said to overcome many of the difficulties encountered in the operation of six-wheel trucks.

The problem hitherto has been in delivering the power from the engine to the rear wheels. In models with only one engine, the drive has had to be transmitted through the first rear axle to the one behind. If one of the wheels on the first rear axle rolls over a bump or into a hole, or if one of the tires is under-inflated or partly worn, it causes a strain on the second rear axle, the Relay Company points out. This has resulted in losses of power and efficiency, of unnecessary strains on one or the other axles and an early wearing out of the parts. In the new dual-motor model each engine drives one rear axle independently via a separate transmission and differential.

The engines may be used in combination, or one at a time. Each engine has its own transmission. An air mechanism shifts the twin transmissions in synchronized time. This might be termed a "fool proof" feature, since it eliminates the human element where the driver is

concerned and insures the twin shiftings in exact mechanical harmony. One lever will shift both gears when both engines are in use. Two simple movements from the driver's seat connect or disconnect either engine.

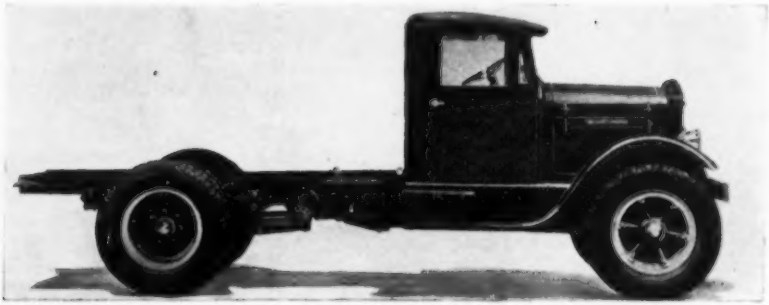
The new model is equipped with heavy-duty air brakes, with cast brake drums and moulded brake blocks on all six wheels, and air connections for trailers. Twin emergency brakes offer an added margin of safety.

Improved riding qualities, saving on tires, and better distribution of the load are possible in the new model because of the Relay axle. This Relay principle which suspends the load like a pendulum, allowing it to swing back and forth, reduces horizontal impacts on all the rear wheels and is said to be an important factor in protecting the roads over which the truck travels.

Even with maximum loads, acceleration is claimed to be rapid because of the dual engines. Twenty-two inch diameter balloon tires will be standard equipment.

Many new features for the comfort of the driver have been provided in the new model. Among these are adjustable driver's seat, sleeping accommodations on long hauls and ease in steering and operating the controls. A hydraulic booster mechanism on the steering apparatus lessens steering strain and reduces driver's fatigue, since no effort is required to turn the steering wheel—merely a guiding movement—regardless of the load carried—and should the "booster" mechanism get out of order, the driver can steer mechanically.

Summed up, the mechanical advancements on the new truck are: two engines, dual-drive, seven speeds, booster steering, power shift, Relay axle suspension, air brakes, and multiple traction. Similarly, in performance the new improvements are claimed to permit express speed on the highways, carload capacity loads, driver economy, double dependability because of the two engines, highway protection, lower costs, greater hauling profits, and maximum safety.



New Pierce-Arrow Trucks

Complete New Line of Medium and Heavy-Duty Models is Offered—Range is from 2 to 8 Tons

A COMPLETE new line of medium and heavy-duty trucks has recently been announced by Pierce-Arrow, of Buffalo, N. Y. The new units include five models with a range of 12,000, 18,000, 24,000 and 34,000 pounds vehicle gross weight, as well as a special 34,000-pound six-wheeler for extra heavy duty. Prices range from $2,950 to $7,000.

The new 2-ton (12,000-lb.), 3-ton (18,000-lb.) and 5-ton (24,000-lb.) units are each offered on three wheelbases. The 8-ton (34,000-lb.) unit is offered on two wheelbases. Save for capacity, wheelbase, frame dimensions and double rear wheels, specifications of the six-wheeler correspond to the specifications of the 5-ton chassis.

Engines throughout are six-cylinder, L-head type. Bore and stroke are 3¾" x 4½" in the 2-ton chassis; 4⅛" x 4½" in the 3-ton; 4⅝" x 4¾" in the 5-ton and 4¾" x 5¾" in the 8-ton, giving piston displacements of 298, 361, 479, and 611 cu. in. respectively. Horsepower ratings are: 70, 77, 103 and 130, respectively.

Pistons in all engines are cast iron and valves of special steel. Crankshafts are drop-forged, statically and dynamically balanced and carried in seven main bearings. Engines and transmissions are combined in one unit in the two and three-ton jobs. On other models the transmissions are mounted amidships. Engines on all models have three-point suspension and distributors, generators and starters as standard. An engine governor is standard throughout. Dual ignition, consisting of two complete firing units, is used on all except the 2-ton job. Fuel, oil and air filters are also included in the equipment.

Engine lubrication is by force-feed to main, connecting-rod and camshaft bearings, as well as to the helical timing gears. The down-draft type of carburetor is used on all models. The characteristic Pierce-Arrow radiator design has

been retained. Radiators are of the built-up, tubular core type, with cast tanks and side bars flexibly supported on the frame side rails. Large fans and efficient water pumps complete the cooling system.

Clutches are of the two-plate, dry-disc, adjustable type, with pilot ball bearing in the flywheel. A ball-bearing is also used for the throw-out. Clutches are entirely enclosed, but readily accessible.

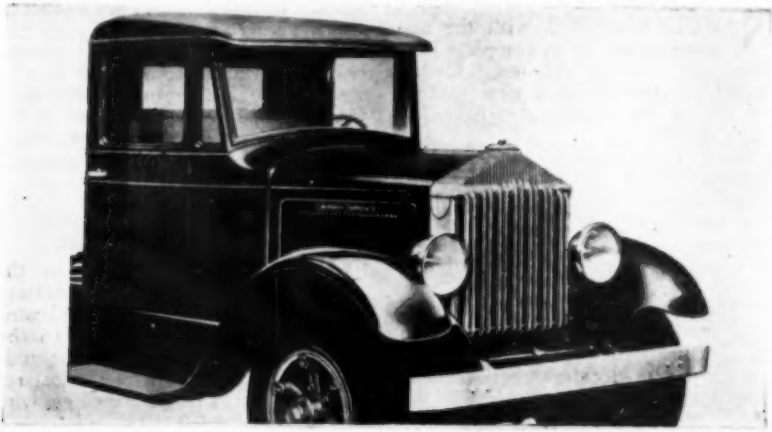
The worm drive, characteristic of the early Pierce-Arrow trucks, is found on the heavier models. Radius rods on the smaller models, and torque arms on the larger, absorb the driving and braking strains. Drive-shafts are tubular, with three all-metal universal joints and self-aligning intermediate bearings. Transmissions are of the four-speed, selective type, with four forward speeds, of course, and one reverse. Provision for power takeoff is provided on the left-hand side, with standard S.A.E. openings.

The front axle is of conventional design, of the reverse-Elliot, I-beam type, with roller thrust bearing at the pivot pin and tapered roller bearings in the wheels. Rear axle is of the full-floating type, with differential and worm shafts supported on ball and tapered roller bearings. A double-reduction rear axle is obtainable at extra cost in all but the 2-ton units. Steering is obtained through a worm-and-trunnion block steering gear, with a 20-inch, non-metallic rim wheel.

Four-wheel brakes are used throughout. The 2-ton chassis is equipped with mechanical, self-energizing brakes and a vacuum booster. The larger models have internal-expanding air brakes, operated from a two-cylinder Westinghouse air compressor and tank. An efficient emergency, or parking brake is mounted on the drive shaft, at the rear of the transmission.

Semi-elliptic springs are used, the front ones being shackled at the rear, and the rear ones shackled both front and rear. An auxiliary or helper spring which contacts with heavy brackets on the frame, supplements the action of the regu-

(Please turn to page 52)



lar springs. Wheels are of cast steel and are equipped with heavy-duty truck tires. Dual rear tires are standard throughout. Balloon tires are standard equipment on the 2, 3 and 5-ton models, while on the 8-ton series, dual solid tires are furnished as standard.

All chassis parts requiring lubrication are fitted with magazine oilers of the capillary wick type. Other parts are fitted with high pressure grease gun fittings. An all-steel cab with seats adjustable to three positions is available on all chassis. Bodies will be furnished to specifications. Equipment includes: speedometer, engine temperature indicator, water heat indicator, oil pressure gauge, air pressure gauge, ammeter and gasoline gauge. Horn button and spark and throttle hand controls are mounted on the steering column. All-steel cowls, front crown fenders, steel running boards and shields and front bumper are standard equipment.

New System of Truck Rating

SIMULTANEOUS with the announcement of its complete new line of motor trucks, Dodge Brothers introduced a new system of rating the carrying capacity of each model.

New type caution plates posted conspicuously on the instrument panel of each truck accurately show the operator the true capacity of the vehicle. The caution plate lists a series of front and rear weights, which vary according to the size of the tires with which the particular model is equipped. This form of rating the proper carrying capacity was decided upon because the operator may easily check the load by weighing first the front and then the rear of the laden vehicle on standard scales. It is stated definitely on the plate that the manufacturer's warranty is voided if the total front and rear weights for a given tire size combination are exceeded.

Overloading has persisted over a long period of years as a common abuse of motor trucks, Dodge engineers explain, and as a result manufacturers, particularly of the larger capacity trucks, have adopted a very conservative rating which does not in any way represent a true measure of the load carrying ability of the truck under all operating conditions, they state.

To more clearly illustrate the new system of determining the correct load for a given model equipped with a certain tire size combination, the engineers point out that one of the models, which under the old conservative method of rating would have been known as a three-ton truck, now has, under the new system, an allowable front weight of 4,479 pounds and rear weight of 15,400 pounds, or a total gross weight of 19,879 pounds. Substracting from this figure the chassis road weight and the normal body allowance, amounting in this instance to 8,129 pounds, the payload carrying capacity is 11,750 pounds or approximately 6 tons, twice the capacity of the nominal rating.

Expands Detroit Office

THE rapid development of the Multibestos sales organization since the introduction of Multibestos "LX" brake lining, has lead to the addition of several men in the middle western territory. The most recent addition is C. H. Hinckley, who will cover the Cleveland district.

K-D Demonstration Car

A TRAVELING educational exhibit of tools and shop equipment that will show fleet service stations the way to increased efficiency and lower costs has recently been launched by the K-D Manufacturing Company, of Lancaster, Pa.

The demonstration car, illustrated herewith, is planning to call on all kinds of shops, including fleet owners' and will cooperate with the local automotive jobber handling K-D equipment.

In commenting on the idea, C. P. Brewster, sales manager, remarked: "After all, seeing is believing. Telling a mechanic how easy it is to handle two piece valve keepers, for instance, is one thing. But showing how the operation is actually accomplished with the proper tool, is another. Let the mechanic *watch* another man use the tool, or better still, let him *use* it himself."

Though familiarly spoken of throughout the automotive field as "the valve lifter people," the K-D Manufacturing Company is also well known as the makers of wheel pullers, valve grinders, bushing removers, wheel stud riveting dies, hack saw frames, bright steel washers, etc. Complete catalog sent free on request.

Dodge at the Road Show

CONTRACTORS and road builders who attended the St. Louis Road Show last month found a representative showing of the new Dodge standard and heavy-duty trucks in the Exposition Building.

Among the chasses on display were some equipped with dump bodies, road scrapers, snow plows and various other accessory equipment applicable to road building work. In addition, the standard 1½-ton, 136-inch wheelbase truck chassis, equipped with 1½-yard gravel body, power hoist and portable compressor was shown.

On display at the Motor Freight Exposition there was also a Dodge truck display, consisting of 3-ton, 195-inch wheelbase, drop-frame chassis—one with furniture van body and one with six-wheel equipment.

What is Viscosity?

IF you are on the lookout for proven ways to get better performance out of the motor, more power, greater mileage with a minimum of fuel and motor-wear, you are invited to send for a free booklet entitled "A Practical Test for Viscosity."

This booklet is concisely written, with a thorough knowledge of modern lubrication methods, and will be sent to you entirely without obligation. Write to the Visco-Meter Corporation, 318 Grote St., Buffalo, N. Y., or to the Editor of this publication. Your letterhead will insure prompt attention.

What YOU

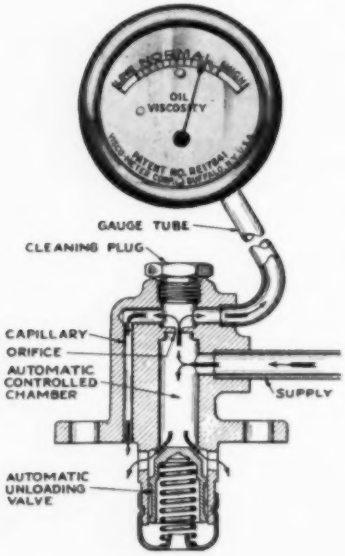
New Products of Interest

Measures Lubricating Value

THE doubtful method of checking motor lubrication by means of oil pressure and oil level gauges, speedometer readings, etc., is now replaced by a device called "Visco-Meter."

This is a device to be installed on the side of the crankcase, with a gauge mounted on the instrument board, whose sole function is to measure and indicate viscosity (body) of the motor oil continuously, while the motor is running. Since viscosity is the key to lubricating value, the Visco-Meter tells at all times whether the oil is fit for use or not.

The design and operation is very simple. It is connected with the oil pressure line, as the illustration shows, where working pressures exceed 8 lbs. per square inch. An automatic unloading valve reduces a small portion of oil to a constant 5-lb. pressure in the chamber of the device. The oil then passes through a calibrated orifice into a divided chamber. One branch is connected with a calibrated capillary resistance tube; the opposite branch is connected with the registering gauge, usually placed on the instrument board.



Light-bodied oil passes through the capillary tube freely, with little resistance. Thus, there being but slight back-pressure on the registering gauge, it indicates low viscosity. When the oil is heavier (more viscous) it does not pass through the tube so easily; the capillary offers more resistance. This sets up a back-pressure on the registering gauge, and it indicates greater viscosity.

Drivers and fleet owners who have used Visco-Meter equipped motors claim an appreciable saving, for besides definitely protecting the motor against the many lubrication

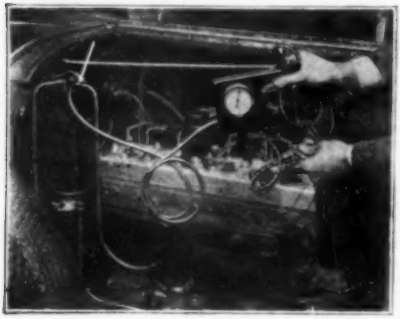
WANT *to* KNOW

disorders that cause costly repairs, Visco-Meter affords a scientific basis for changing the crankcase oil.

This device also shows up improper oils, excessive dilution from badly fitting rings, overheating of motor, oil leaks, faulty oil pumps and dangerously low pressures.

Visco-Meter is made by the Visco-Meter Corporation, Buffalo, N. Y., who also build an Industrial Visco-Meter for rapid viscosity tests. Further details and information can be had by writing to the Corporation at 318 Grote St., Buffalo, N. Y.

Stromberg Moto-Scope



THE Moto-Scope, manufactured by Stromberg Motoscope Corporation, is an instrument designed to test an automotive engine while in operation. This is the correct method of conducting a test, the makers point out, to obtain the true facts as they exist, and the entire test requires less than fifteen minutes.

The Moto-Scope tests valves, carburetors for best adjustment, spark plugs, distributors, gaskets, secondary circuits, etc., one after another, and shows an accurate gauge reading and the exact condition of each unit.

It distinguishes between leaky valves, sticky valves, late timing of valves or ignition, and weak valve springs.

An interesting booklet that illustrates and describes exactly how each unit is to be tested will be sent free to interested readers on request. Many well known automotive fleet operators, dealers and garages are now using this instrument, the manufacturer reports, to their entire satisfaction.

Those who desire a free copy of the Moto-Scope booklet are invited to address The Stromberg Motoscope Corporation, 1145 Diversey Parkway, Chicago, Ill. The Editor will also be glad to send free copies on request.

Thompson Sells Tryon Shackles

REPLACEMENT users of Tryon spring shackles will be interested to learn that Thompson Products, Inc., Cleveland, Ohio, has been appointed exclusive distributor of this shackle to the jobbing trade. It is manufactured by Willys-Morrow Company and is used as standard equipment on such cars as Chevrolet, Oakland, Oldsmobile, Pontiac, Viking, Marquette, Buick, Chrysler, De Soto, Dodge, Durant, Whippet and others.

Multibestos "LX" Brake Lining

ONE of the recent products of The Multibestos Company, Walpole, Mass., is a new type of moulded brake lining bearing the trade mark "LX," signifying latex bonded. The maker's description follows:

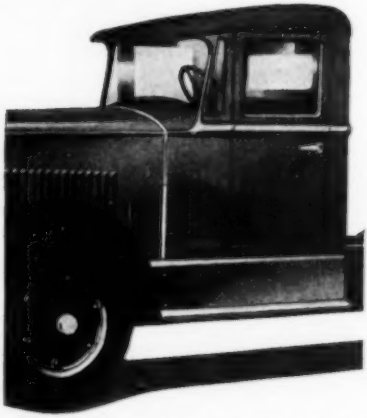
Multibestos "LX" is moulded under extreme pressure to exact width and thickness from crushed asbestos fibre which has been specially prepared to remove impurities and metallic substances. The result is a flexible lining, claimed to give long wear and **uniform frictional** surface, as well as **smooth braking** action with light pedal pressure. There is no tendency to glaze or squeal, and the lining will not expand excessively under heat, the makers point out. When properly installed and adjusted, no drum scratching is likely to result.

For the convenience of the trade and consumer, "LX" is supplied coiled in three lengths or 13½ feet in all of the popular brake lining sizes. Circular and price list sent free to fleet operators on request. Recommended for use on internal brakes only.

Metro Couplex Cabs

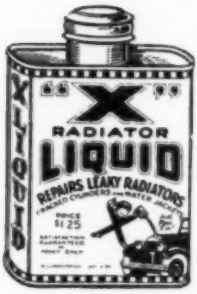
SHOWN for the first time at the recent Automobile Show, the new Metro insulated couplex cab for trucks is claimed to be an innovation in cab construction. It is manufactured by the Metropolitan Body Co., Bridgeport, Conn.

The roof is of one-piece steel construction, and is insulated to protect the driver from heat or cold as well as to eliminate drumming and rattle. The seat and lazyback are adjustable for all driver requirements. Cushions are of the soft spring, air type. Clear vision, one-piece windshield and two-piece rear window afford maximum vision and ventilation.



The entire cab has insulated air pockets between the outlet and inner walls. It is mounted on three points, utilizing ball bearing and compensating springs. General construction is of steel and wood. An interesting circular has been prepared, fully describing the new cab, which will be sent free on request.

X-Liquid in New Dress



IN conjunction with their products, X-Liquid and X-Radiator Flush, X-Laboratories, 25 West 45th Street, New York City, is making a special free offer of a pressure flushing gun for cooling system servicing. The gun is simple in construction and easy to operate

A recent change has been made in the style of label used on the cans in which X-Liquid is merchandised. The new label, of modern design, retains all the characteristics of the old one and is as striking in design as that of X-Radiator Flush, the product that cleans cooling systems. The style of aluminum cap has been also improved.

Readers who are interested in securing a free flushing gun for cleaning cooling systems, are invited to write to the company for further details. The Editor will handle this if you prefer.

Samples of Enamel Offered

FLEET maintenance men interested in a new type of quick-drying enamel that is claimed to outlast any other type of finish, are now receiving full pint samples in any desired color, as the result of an offer recently made by a leading manufacturer, through the columns of this publication.

If you have not already done so, you are invited to participate in this paint-testing campaign. Just drop a line (on your letterhead) to The O'Brien Varnish Co., 115 Johnson St., South Bend, Indiana, and ask for this full pint sample. Be sure to state the color desired. The Editor has made arrangements to handle these requests, and those sending their requests to our Editorial Offices will receive prompt attention.

Weed American Tire Chains

THE distinctive feature of the Weed American, a new chain offered by American Chain Company, Bridgeport, Conn., consists of a bar welded across each cross-chain link that comes into contact with the road surface.

THE NEW CROSS CHAIN

WHEN THE CROSS CHAIN WEARS

The bar serves several purposes: It makes the chain wear longer, as there is more metal to wear through; it prevents side slips and skids, because the bar, in riding under the tire, tilts downward and grips the road; the bar, also, due to its gripping qualities, gives added traction in snow and deep mud.

Other features of the new American chain include a welded, non-kinking side chain and a new type of easily detachable connecting hook. A new catalog has just been prepared and will be sent free on request. The Editor will secure a copy for you, if you prefer.

United American Bosch Formed

THE new United American Bosch Corporation, recently formed, joins the Robert Bosch Magneto Company, Inc., with the American Bosch Magneto Corporation into one organization which aims to better serve the various industries with its many products.

To the users of Bosch products, a more extensive sales and service organization is thus made available. The United American Bosch Corporation, in addition to the products of its own manufacture, will become the exclusive sales outlet in American territory for all products of Robert Bosch, A. G., of Stuttgart, Germany.

The officers of the United American Bosch Corporation are: Arthur T. Murray, president; Morris Metcalf, vice-president and treasurer; Louis Bech, G. J. Lang, Leon W. Rosenthal, Hermann Waker, J. E. Wild, vice-presidents; R. W. Washburn, secretary and assistant treasurer. As in the past, the general offices of the corporation will be at the main plant in Springfield, Mass., with branches in New York, Chicago, Detroit and San Francisco.

Clancy Dodge Representative

THE appointment of Walter F. Clancy as Regional Truck Representative for the Detroit region was recently announced by Dodge Brothers Corporation. In his new position Mr. Clancy will have jurisdiction over Dodge truck sales matters in his region and will supervise the operations of truck sales representatives. He has had long experience in the truck business and with the Dodge organization and is particularly well known to Dodge dealers in that region.

How to Stop Leaks

ONE way to effectively stop gasoline leaks from the tank, gasoline lines and exhaust system; oil leaks at gaskets and at cracks in crank or gear cases, is described in the new Smooth-On automotive booklet, recently announced.

The booklet also explains how to economically and effectively repair water jackets that have developed long or short cracks, or have even had pieces broken entirely out from freezing. Lasting and serviceable repairs, it is claimed, can be made by this method, outlined in the booklet. For your free copy address Smooth-On Mfg. Co., Dept. 71, 574 Communipaw Ave., Jersey City, N. J., or the Editor of this publication.

Multibestos Appoints Smith

ANNOUNCEMENT has recently been made of the addition to the staff of Multibestos Company, Walpole, Mass., of H. B. Smith, as manager of the Detroit division. Mr. Smith is eminently qualified to do his share in handling the large volume of business anticipated as a result of the introduction of a new type of brake lining recently, known as Multibestos LX, a flexible moulded product.

New, Free Bushing Catalog

THE 1931 catalog of The Bunting Brass & Bronze Company, Toledo, Ohio, is now ready for distribution. Here is a most complete alphabetical catalog, listing piston-pin bushings, steering-knuckle, tie-rod and spring bushings, enlarged far beyond any previous edition. There are many changes. A new price structure now applies. Free copies on request. The Editor will secure a copy for you, if desired.

Free Survey on Wholesaling

DISTRIBUTIVE trends that have complicated wholesalers' problems during the past few years are discussed in a report just issued by General Motors Truck Company, Pontiac, Mich.

This is a nation-wide, impartial study of the wholesaling of non-perishable products that reveals the fact that efforts spent in planning better truck operation will yield more profitable returns for the average wholesaler than an equal amount of effort directed toward almost any other phase of his business.

Readers of this publication in the wholesaling field are invited to write for a free copy of the "Wholesaling Survey." It will be sent at once without obligation. The Editor will get you a copy, if you prefer.

Europe Adopting Governors

ACCORDING to A. A. Bull, president of the Handy Governor Corporation, Detroit, Mich., governors are now standard equipment on many types of automotive vehicles, and his company's export business has become an increasingly active factor in its production and sales.

Mr. Bull recently made a six-weeks trip to Europe and in cooperation with Mr. T. I. Larson, of his company's engineering department, an extensive survey of the European market was made.

While the installation of automatic control was, until two years ago, almost unknown in European transport, Mr. Bull further points out, the use of automatic speed controlling devices is sharply increasing.

Eveready Prestone Hydrometer

THE National Carbon Company, New York City, offers a new special tester which has been expressly designed for testing radiators that are filled with solutions of Eveready Prestone, one of the popular anti-freeze agents now on the market.

The tester itself is a hydrometer and thermometer combined, with a special scale that is easy to read and correctly determines the protection afforded at any temperature in the radiator within the thermometer scale.

Because this tester is designed to read only the one anti-freeze, the use of a large float scale, giving greater reading accuracy, has been possible, and the protection chart, a part of the tester, with only one set of figures, is very simple to read.

This tester can only be used for testing Eveready Prestone solutions and will not register correctly if other anti-freezes are present in the cooling system. It can be purchased from distributors handling Eveready Prestone at a moderate cost. Complete instructions for use come with each tester.

Free Book on Plating Aluminum

A NEW booklet entitled "Electroplating Aluminum" has just been issued by Aluminum Company of America, Oliver Bldg., Pittsburgh, Pa., as an aid to the practical plater. Platers have avoided work on aluminum because they thought it difficult and unreliable. The book points out that aluminum is actually as easy to plate as other metals, but that certain simple precautions should be observed. Copies free on request to those interested.

Maintenance Problems
(Continued from page 16)

sible to hold time and labor charges within reasonable bounds. I also believe that more thorough inspections are necessary if road delays are to be held within safe and sane bounds. As the third plank in the platform, I favor more consideration of the unit maintenance plan. Where the size of organization permits, this is the most effective way of reducing man-hours and getting vehicles back into service within the shortest possible time.

By adhering to a maintenance program carefully planned and executed it is possible to keep costs within reasonable bounds.

Should drivers be educated along mechanical lines? A few companies actually develop drivers from their mechanics. Whether this is the best practice, is open to question. Drivers need special mechanical experience. Mechanics could undoubtedly profit if they were closer to the drivers' problems. But the requirements of the two jobs are not identical. The driver must first of all enjoy and even crave contact with human beings, while the born mechanic is happiest when he is tinkering with masses of metal and fine machinery.

In spite of these fundamental differences, it is important for the driver, particularly in intercity work to have some mechanical knowledge and ability. Up-to-date companies are therefore enlisting the drivers in their efforts to keep down mechanical costs. There are many others, of course, which can be worked out to meet particular situations.

Good driver performance is the "be all and end all" in the successful operation of a commercial vehicle. In an unstandardized fleet the chances for this achievement are more remote than in the case of a fleet of the same make. Involved in the solution of this problem is the possibility of drivers having the same vehicle every day.

With the standardized fleet it is apparent that the foregoing problem is somewhat simplified in comparison with the problem of always being able to give the driver in a mixed fleet a regular vehicle. By giving a driver a different make of vehicle each day the time is prolonged when he will have mastered the operating peculiarities of each vehicle and the niceties of control that go hand in hand with good performance.

This policy of driver-vehicle specialization is likewise a potent factor to be considered even in a standardized fleet, because the human equation in performance is affected by every changing road condition.

All of these variables are tied in with accident liability, a factor of considerable moment in driver performance. If, therefore, special driver-vehicle assignments will lighten the driving burden and reduce accident liability, then by all means they should be given every consideration.

(To be continued)

EFFECTIVE January 1st, those units of Union Carbide & Carbon Corporation whose products are used in the main for oxy-acetylene welding and cutting are to market their products through the Linde Air Products Co., according to an announcement recently received.

Welding Cracked Blocks
(Continued from page 44)

forward; the welder uses the swinging motion of the blowpipe and rod, characteristic of all ripple welding, the motion of the blowpipe and rod being opposite to each other. The inner cone of the flame should be kept about ⅛ or ¼ in. away from the surface of the puddle and sufficient flux should be frequently applied so that a layer of molten flux will precede the bronze. The vee should be completely filled as the weld progresses to avoid delay in going back to touch up previous work. The proper welding speed will be indicated by the speed of the tinning film. The bronze should never be flowed in faster than tinning progresses.

Flux should be used freely throughout the operation so that any impurities or bubbles of gas in the weld metal will be forced to come to the surface and then escape. Bright spots on the metal in the puddle indicate the presence of oxides or impurities and should be worked out with the welding flame or with flux. Too much flux is not only wasteful but prevents proper making of the joint. Use just enough to secure a good adhesion between the added metal and the cast iron or the previous layer of bronze. Avoid breathing the white fumes given off from the bronze. These fumes, if inadvertently inhaled in large quantities, may prove irritating.

Bronze should be deposited at the lowest temperature at which it will readily flow. The weld should be carried through to completion in one operation if possible. The welding operation should finish as near as possible to the middle of the crack unless the end of the crack extends to the edge of the casting, in which case the weld will end at that point. Where breaks are jagged and have cracks which run out at different directions, it will be necessary to stop welding as the central meeting point of these cracks are approached. If welding is interrupted and the puddle chills, care must be taken to make it molten again before any new bronze is applied. When the welds of a group of cracks approach the central point where the welding is to end, the deposited bronze in adjoining cracks should be remelted for an inch or more and allowed to flow down into the advancing puddle. It is a good idea to heat the vicinity of this final point for some distance around it after the welding is finished, so that any cooling strains in the various individual cracks may be relieved during the cooling of the entire central portion.

Slow cooling is advantageous for bronze-welded parts. Even a sheet of asbestos wrapped around the welds will help to reduce the cooling rate. The block should not be subjected to any stress until completely cooled.

When the weld is finished (Fig. 8.) it should be brushed with a wire brush to remove any excess flux which may have adhered to the metal, and also to remove the soot and deposit from the welding operation. The appearance of the finished weld may not seem to be very neat when compared with the smooth side of the casting. (Fig. 9.) This rough appearance can easily be remedied by grinding or filing if desirable, although it is probably preferable to leave as much of the reinforcement in place

as possible. When the weld has been ground off smooth, except for its different color, it cannot be distinguished from the casting metal.

In instances where a piece has been broken out of a cylinder, the broken piece should be lined up and vees should be chipped out as for a single crack. A backing up bar or plate used with C-clamps can sometimes be used to hold the broken parts in line, especially where pieces are broken from the edges. The same welding procedure should be carried out, except that tack welding will be necessary to hold parts in place for the first time. A welding rod can be used to hold the pieces in place while tack-welding is being done as shown in the sketch (Fig. 10). When pieces have been tack-welded, it is necessary, in the final welding work, to melt out and reweld all the tack welds. This will insure perfect penetration and adhesion of the weld metal and a uniformly strong joint will result.

The usefulness of bronze-welding as a method of repair is not limited to cylinder blocks. Many other automotive parts can be repaired by this method, including cast-iron manifolds and all parts which are made from malleable iron.

Air Doors for Busses

A NEW and interesting booklet, entitled "Why Air Doors for Busses" has recently been brought out by National Pneumatic Company, Graybar Bldg., New York City. Fleet operators in this line of business are invited to send for free copies which will be sent without obligation. The Editor will get a copy to you, if you prefer.

Experienced Maintenance Supervisor Available

A PRACTICAL maintenance man, with over six years' experience in operation and maintenance of motor trucks and buses now seeks a connection with transportation or vocational fleet.

In addition to practical fleet maintenance, have had considerable machine shop experience and technical training. Was previously supervisor of Eastern public utility fleet of eighty vehicles.

Desire to connect with concern in vicinity of New York City. Complete details as to ability, previous accomplishments and references available on request or interview.—Address communications to Editor. THE FLEET OWNER, 90 West Street, New York City. All replies will be held in strict confidence.

Buys Fleet of 150 Trucks

THE program of extensive plant renovations and enlargements that has been carried out recently by the Ward Baking Company forms a splendid example of how the large corporations are joining states, municipalities and public utility concerns in bettering employment and business conditions by carrying on uninterrupted construction and replacement schedules.

In addition to the plant expansion and alterations, the baking company has purchased 150 Dodge Brothers motor trucks since the first of last year. This new motor truck equipment has been distributed evenly among the Newark, New Jersey; Pittsburgh, Pennsylvania; Cleveland, Ohio; and St. Louis, Missouri plants.

Motor Truck Improvements
(Continued from page 47)

marked refinements, and the time and cost factors have been reduced through proper lubrication design.

The commercial car engineer has taken advantage of the better steels and material now available which contribute to more satisfactory and economical performance of the truck. The engineer today has a larger selection of alloy metals of higher tensile strength and longer life.

Present tendency to employ balloon tires on commercial cars closely following the rapid change from solids to pneumatics, is bringing about changes in commercial car design as well as operating methods, and these features will prove of more than unusual interest to the fleet owner who scans his transportation costs.

Co-operating with the commercial car engineer is the tire engineer—to provide the type and capacity of tire that will meet the individual operation conditions. Attention is paid to the problem of overloading, and effort is being made to bring about standardization in load space so that the operator may transfer his old body to the new chassis without being unduly handicapped.

Outwardly the 1931 commercial car will reflect the trend for better equipment and accessories. Much has been accomplished by the equipment and accessory specialist during the past year so that those interested in highway transportation may anticipate some new and novel features. No longer is the commercial car a chassis with just a body. It is a distinctive, attractive combination, closely approximating the appearance of the modern passenger car. Finish and appointments leave nothing to be desired by the merchant who wishes his delivery equipment to be the last word. New colors and combinations will be seen. The 1931 commercial car is not only better than its predecessor, but it is most reasonably priced. Equipment that a short time ago listed as extra is now standard equipment and it should cost less to operate and maintain than former designs. Last but not least are the refinements which provide greater comfort and convenience for the driver.

B. & B. Clutch Servicing
(Continued from page 32)

line in the pilot bearing.

3. Place driven plate assembly in flywheel with chamfered end of hub to the rear.

4. Place cover assembly in flywheel lining up driven plate and pilot bearing with an extra shaft or aligning arbor. Insert and tighten the clutch holding screws and then pull out aligning shaft or arbor.

5. The transmission can then be assembled to engine.

6. Adjust clutch pedal as outlined in paragraph "B".

Do not, under any circumstances, let transmission hang in clutch assembly, nor put oil or kerosene in the clutch. Keep facings dry.

(Editor's Note:—Since servicing of clutches is one of the most important phases of work done in the fleet operator's repair shop, and also one of the most difficult and often misunderstood jobs, this publication is happy to have secured the opportunity of publishing so intimate and thorough a treatise on this subject. Who is better fitted to discuss clutches than the service manager of one of the largest clutch manufacturers?)

Gasoline Economy
(Continued from page 19)

graduated in quart lines (it might also be graduated in gallons) starting from the *top* and *not* from the bottom, as with the conventional gasoline stick. Because of the fact that the many different trucks in a fleet are bound to have tanks of varying capacities, it is important that individual rulers be made, and the number of the truck *burnt* into the handle. The correct graduations, of course, will take a little time and care to make, but the savings eventually made will offset their small cost, the writer feels sure.

The idea in having the graduations *start* from the *top* of the ruler, and run to the bottom is readily apparent, inasmuch as it indicates the number of quarts or gallons to be placed into the tank by *direct* reading. The reader will also note that the gasoline level is intended to be kept two inches below the top of the tank, as the stick shows. This is to prevent the loss of gasoline while the vehicle is on the road during the first hour, crowded roads and severe jostling causing it to slop around and spill out, if filled to the top. Acceleration and deceleration also cause this slopping around of the fuel. Then too, in the event that more than the required amount of gas is pumped into the tank, it will not overflow, but be "saved" in the tank, although not going on the records, and "lost," as far as the paper records are concerned.

In our particular operation, the gasoline tally sheet showing the number of quarts (or gallons) disbursed by the garage employee to each vehicle is checked in the usual manner and posted in the office, but our new records show that there are less errors than with the old routine, less gasoline wastage, better economy, and very little, if any, sloppage loss—all with the same clerical and manual labor.

Another malpractice is seen in the repair shop, where gasoline is often considered as an "all-purpose" fluid and is generally drained from the vehicle tank for washing units, parts, machines, benches, paint brushes, chassis, bodies, hoods, men's hands and an untold number of other uses.

The writer recommends that the gasoline tank should be drained before the vehicle is sent to the shop, and the amount of gasoline removed credited to the vehicle, less one half-gallon in a temporary container fitted with an outlet connection on the bottom for the carburetor line, so that motor inspection, tests, etc., can be made to determine the mechanical repairs necessary.

In conclusion, the writer believes that when gasoline is guarded and accounted for in the same manner that engine lubricating oil is now handled, the actual savings (in cash, and not only on paper) will astonish and surprise the fleet operator or maintenance superintendent who has the forethought to heed this short piece of advice.

(Editor's Note: This article reflects the experiences of a fleet maintenance man and was contributed by an anonymous reader of this publication. Believing that the ideas it contains have some merit and will interest many of our readers, we are glad to pass it on to you in this manner. We would be very glad indeed to receive further reactions on the same subject which this article may have inspired).

1930 Tests Stability of Truck Industry

(Continued from page 12)

erating radii has increased because of the introduction of sleeping compartments in truck cabs for relief drivers.

The use of motor trucks by railroads increased in 1930. The number of trucks operated by the railroads exceeded 7,000 vehicles, exclusive of the Railway Express Agency's 10,000. Class I railroads have 10,409.8 miles of truck routes and $1,580,862 in truck freight revenue.

Several of the railroads have found it more profitable to use the motor truck in the short haul. The Omaha railroad which more than a year ago acquired truck routes that hauled freight to 200 Minnesota and South Dakota towns has announced a substantial profit for 1930. Other railroads are using trucks in replacement of local freight trains, handling freight between main and sub-stations in large communities, handling freight between their own and other railroad stations in various communities, and in hauling freight between shippers' or receivers' doors and freight stations.

As in 1929, several important mergers, involving railroads and some of the larger transcontinental bus systems took place. Railroads own a controlling interest in many of the leading bus lines and have considerable money invested in others. There were 95,000 buses in use during the past year. Consolidated schools used 47,500 buses, an increase of 4,500 over 1929.

The bus further popularized itself during the past year in city transit. Operation of motor passenger carriers by street railways increased from 11,500 in 1929 to 13,000 in 1930.

In severe traffic congestion, street cars moving on fixed tracks find it difficult to earn profits and are being replaced by buses which weave in and out of the flow of modern motor traffic and discharge and pick up their passengers at the curb. The year marked the replacement of street cars by buses on many non-paying lines of this nature. Buses are used almost exclusively in newly developed areas, as cities grow.

The electric surface railways on Manhattan have started a move to replace all their electric lines with buses, and from all indications will have the highway carrier in service during the coming year. Bus operation costs reached a low average of one cent per passenger mile.

Safety of operation of both the bus and truck has been improved by the increased number of driver-training courses which have been conducted under the sponsorship of operating companies and other interested organizations.

Drivers for a great number of the commercial vehicle companies are required to pass a physical examination, display expert operating ability and show courtesy on the road before they are allowed to operate a truck or bus. Periodic inspection of drivers and vehicles is held by numerous companies.

These facts have resulted in a greater public appreciation of the highway transports' economic advantages which justifies the prediction of a greater use and production of trucks and buses during 1931.

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mated the worn tires should be placed on the inside position.

Changing positions of tires proves very beneficial. Particularly in delivery service, curb chafing may result in tire failure. While this condition should be corrected through education of the drivers, nevertheless if it is encountered the tires may be reversed before the sidewall has been badly scuffed and thus avoid the necessity of premature scrapping of the tire. There are many phases of successful operation which rest with the driver and can only be corrected through education. Among these are fast driving, quick acceleration, severe braking, fast corners, etc. A driver who is hard on tires is hard on the vehicle in all ways.

Mechanical adjustments are of course important and should be checked according to a schedule. Alignment of front wheels is particularly important in delivery service because of the tendency to get out of adjustment through curb shock. Smooth and efficient brakes not only insure longer tire mileage, but are a safety factor that no operator can afford to overlook. Wobbly wheels, loose bearings, rear axle alignment, etc., while not prevalent, are encountered at times and should be corrected.

Scheduled inspection of tires may reveal injuries that can be economically repaired and prepare longer tire life.

The foregoing items all go into a scheduled service plan and is exactly the same plan followed by all tire manufacturers in their tire operations on large bus fleets. If the tire manufacturer finds it to his advantage to install and pay for this scheduled service, surely it would pay the small operator.

BELDENLAC — the shiny, black lacquered cable with the orange rubber core—is built to standards that meet U. S. Aircraft Specifications. It withstands oil, heat, abrasion, and corona as no other spark plug wire yet developed.

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